THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXXIX. No. 2185.] LONDON, MARCH 28, 1905. [57TH YEAR. PRICE 6d.

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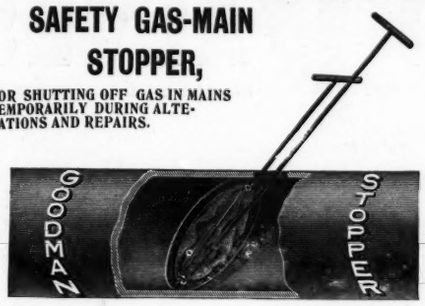

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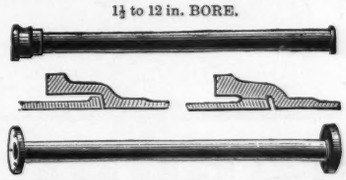

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dust—41 tons 4 cwt., at 1s. 11d. .	3	19	0
Washed slack—15 tons 17 cwt., at 6s. 6d.	5	3	2
	£9	2	2

This works out at a fraction under 2s. 4d. per 1000 gallons. Can this result be beaten? I may add that the water-feed to the boilers is heated by the exhaust steam from the engines to 200 deg.

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C. D. LENG.

High Street, Sheffield, Dec. 19, 1904.

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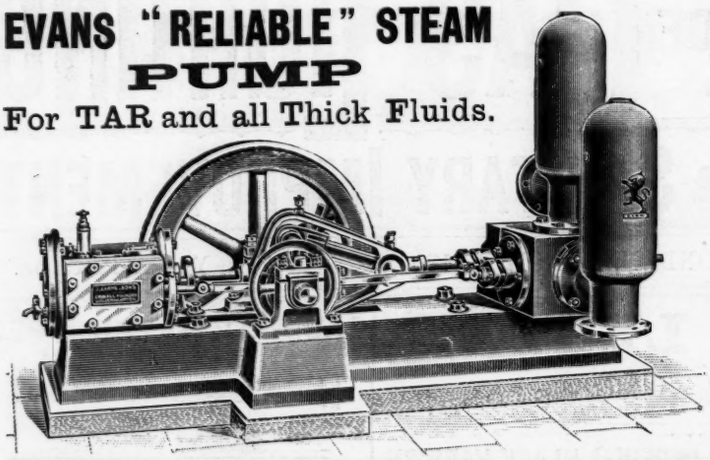

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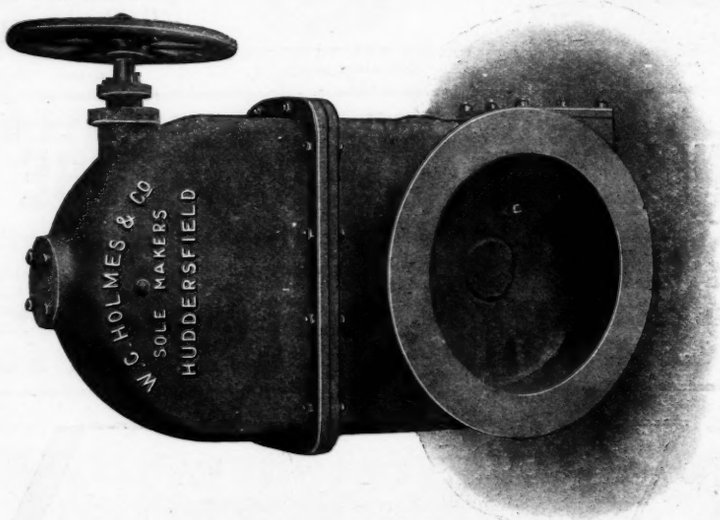

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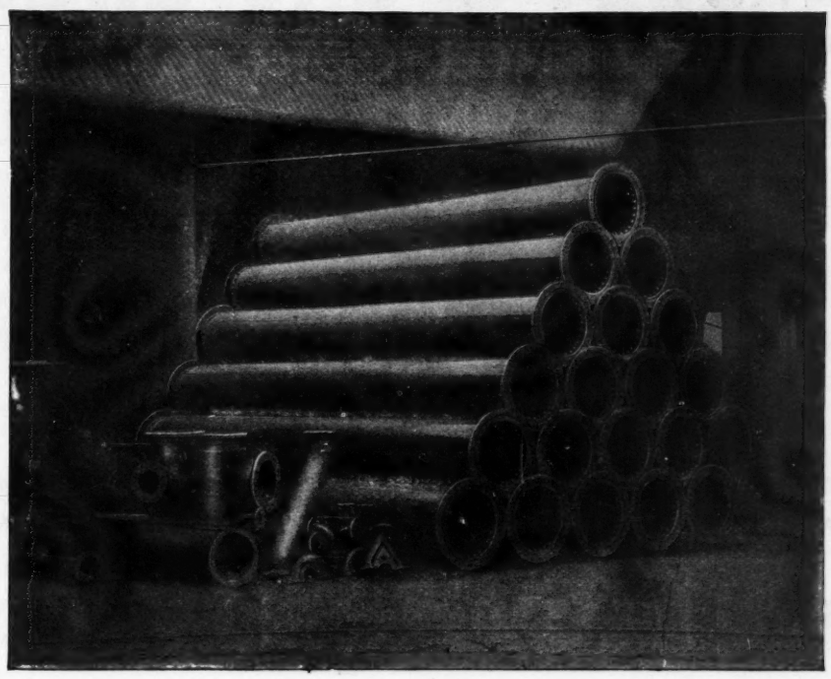

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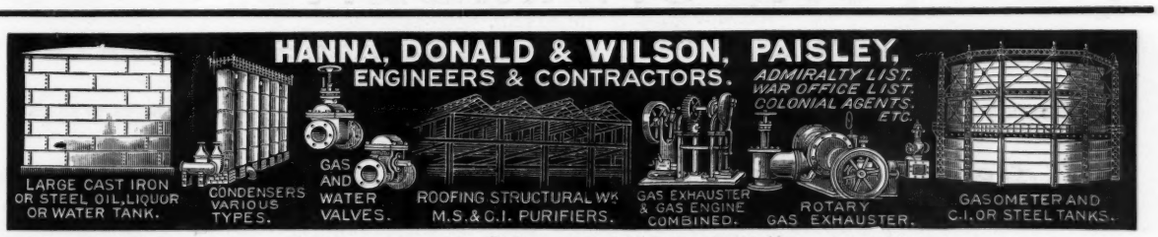
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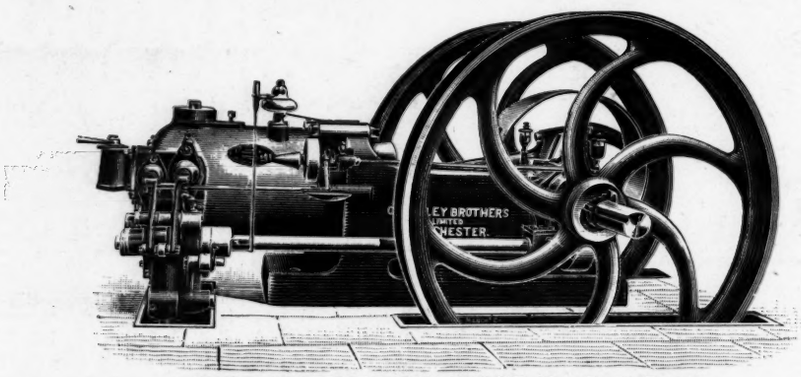

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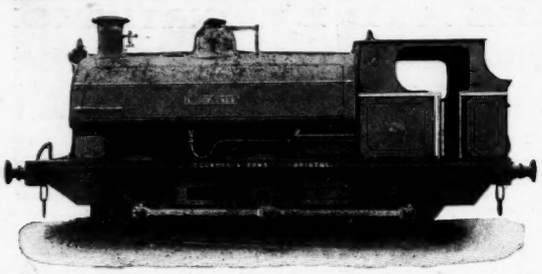

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Microscopical examination has proved that from the moment of lighting the cotton fibres begin to coalesce, and at 50 hours have so shrunk as to distort the mantle into a "waist" at the point where the flame is hottest. After 300 hours only a single solid filament remains—considerably smaller in diameter than the original thread—which, by reason of its lesser surface and greater density, is incapable of becoming fully incandescent. Thus, ordinary mantles **decrease** in illuminating power from the moment of lighting.

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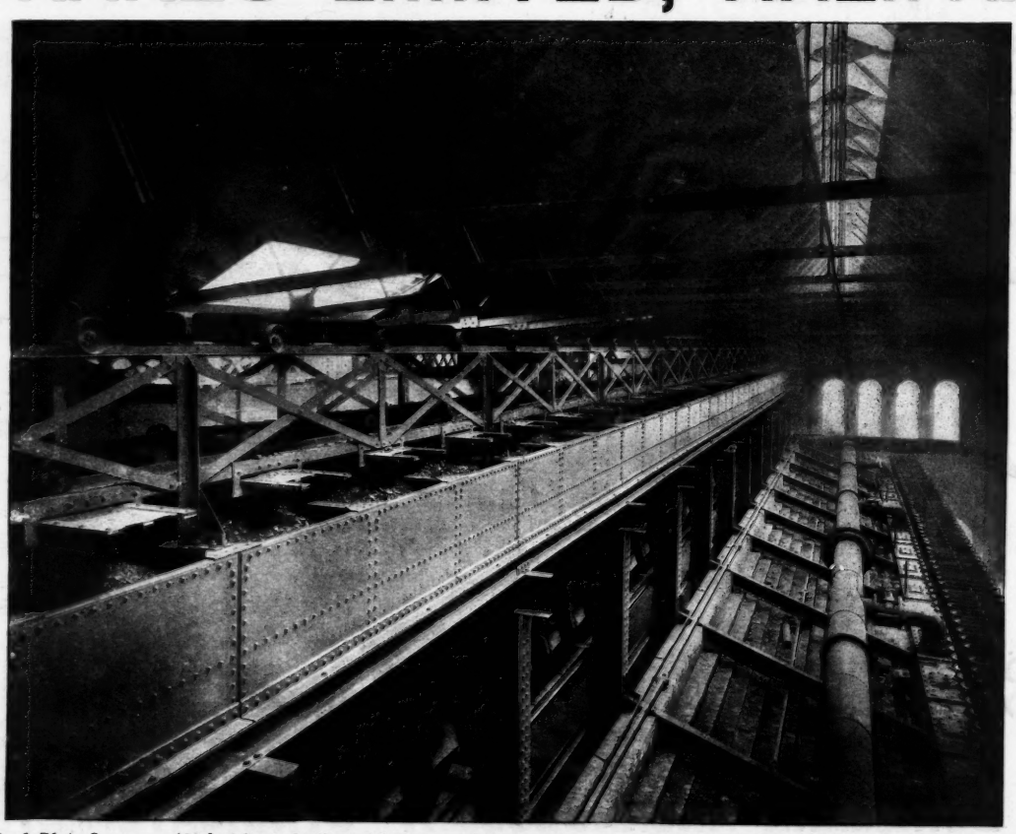

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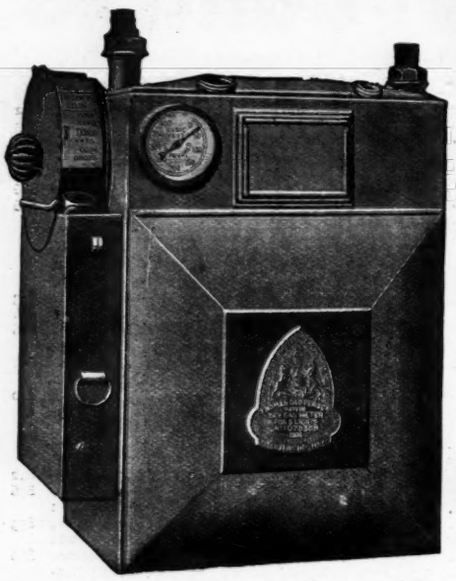

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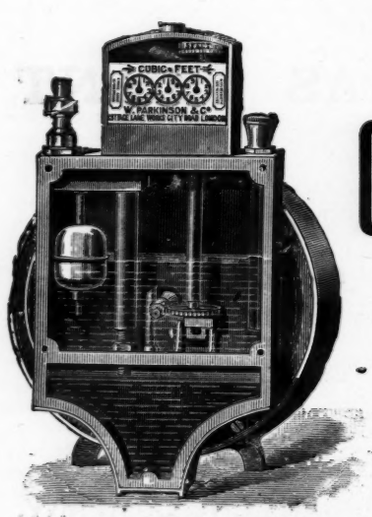

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. LXXXIX., No. 2185.—TUESDAY, MARCH 28, 1905.

EDITORIAL NOTES—GAS, &c.

The London and South Suburban Gas Bills—A Serious Grievance.

THE position at which we have arrived as the outcome of the decisions on the London and South Suburban Gas Bills of the Commons Committee, presided over by Mr. Cawley, is one on which all who have the best interests of the gas industry at heart will look with mixed feelings of gratification and regret. Although the accepted method of procedure was, on these Bills, pitilessly sacrificed to convenience, no one can really complain. The Committee bent themselves intelligently to their task; but hedged round as they were by the report of the Departmental Committee, the Machiavelianism of the County Council, and the case of the Gas Companies, they had, on the chief matters submitted to their consideration, a task of an unenviable character. The recommendation of the Departmental Committee as to the 5 cubic feet rate for testing gas of an illuminating power below 16 candles was the Gibraltar of the whole of the proceedings; and it is that which has to be stormed before the gas industry can secure the reasonable freedom that is necessary now that it is almost universally agreed that cheap gas, and a gas in which day by day illuminating power is becoming more and more a minor and negligible consideration, is what the public and industrial enterprises of the country want. Mr. Cawley's Committee felt themselves bound by the report of the Departmental Committee; but while that was so—while they were manifestly in favour of conceding the claims of low illuminating power gas, and were prepared to grant a little concession to help things forward—they acknowledged they were unable under the circumstances to see their way to completely throw over the counsel of the Departmental Committee on this question of testing.

The situation is one that demands most serious attention on the part of the gas industry; and welcome will be every suggestion that can be made to strengthen Sir George Livesey's hands in his onslaught on a condition of things that subordinates the gas industry to scientific fanaticism and (as has been abundantly demonstrated in the past week) harmful error. Science and its votaries are received with gladness as friends and helpmates; but their domination, when that domination fetters progress, is a condition that cannot be tolerated, or be permitted to long continue. The chain has both been shortened and loosened; but it is not sufficient. This fixed 5 cubic feet rate of consumption, in the "London" No. 1 argand, for gas of a lower illuminating power than 16 candles has set up another obstacle to, and given to the enemies and competitors—and they are many—of the gas industry another weapon with which to hinder progress in the direction the industry has turned its face. The question must not be allowed to sink to dormancy because success has not attended the first encounter in the endeavour to break down a prescription that neither justice nor wisdom can support. Agitation has removed from the London Gas Companies, the South Suburban Gas Company, and from all others who seek the relief, the nuisance and worry of lime purification, and the senseless requirement as to the extraction of a few grains of sulphur impurity per 100 cubic feet of gas. And agitation must be kept alive till Parliament is convinced that in respect of testing for illuminating power the Departmental Committee have brought upon the industry an injustice which ought to be remedied. The meeting of the Institution of Gas Engineers is approaching; and it may be suggested that this is a matter that should take a pre-eminent position in their deliberations. For there is not the slightest reason why the Institution should not move in the matter of obtaining from all parts of the country, through the affiliated Associations, signatures to a petition direct to Parliament and again to the Board of Trade, pointing out the iniquity of the new prescription for tests, and praying for its removal. By this means, it would be shown that the gas industry at large regards it as objectionable and as a serious grievance. Until redress has been obtained, the grievance must not be allowed to rest.

It is not intended here to discuss at any length the numerous matters dealt with in the four Bills which constituted the group of London measures, as the various conclusions can be readily gathered from our "Notes from "Westminster," in this and last week's issue, and the arguments from the general reports. Two or three of the questions, however, require a little extended reference; but first the principal points may be generally summed up to show the position of affairs as they at present stand. The abolition of lime purification for the removal of the sulphur compounds so far as the London Companies and the South Suburban Company are concerned has been confirmed by the Commons Committee; but tests for calorific power, for sulphur impurities, and by flat-flame burners ("for informa-"tion only") and not penalties are to be undertaken in the case of the three London Companies, but not in that of the South Suburban Company. Sunday tests for illuminating power are to be optional and not obligatory in the Metropolis. The sulphuretted hydrogen test for London gas is to be made less stringent. The superfluous and illegally constituted body who hold office as the Metropolitan Gas Referees have not yet fallen from their high estate as the result of this second attack in Parliament by Sir George Livesey. It becomes a question, however, whether, if the Gas Referees are not legally constituted, the Companies can be legally bound to abide by their prescriptions and requisitions. Then, after a severe contest, the clause referring to 13-candle gas was withdrawn from the South Suburban Bill, under circumstances which will be fully explained presently; and, as will have been already gathered, the illuminating power test prescribed for 14-candle gas in London is that proposed by the Departmental Committee, but its severity has been partially relaxed by extending its application, before the Companies can be penalized for deficiencies, to the average of three days' tests instead of only one. It is merely to two or three of these various points that further attention will be directed.

The injustice of the test for illuminating power to which gas of qualities reduced below 16 candles is to be submitted by being burned at the fixed rate of 5 cubic feet in a "London" No. 1 argand, has been convincingly proved, and has been covered with opprobrium by all but the known enemies of the industry. If the proceedings are studied, it will be found that there was not a single man put into the witness chair with general practical experience in the manufacture of gas to defend the wrong that has been done. It is not merely a question of nomenclature. The recognition of a gas that is returned as 13 candles by a test that is wrong in principle, and that is destructive to the light-giving power of that gas, as satisfying the statutory requirement of 14 candles, is not the simple matter that those within the pay of the London County Council would have Parliament believe. It means much more than that to the gas industry, and to the gas they supply, as was demonstrated by Sir George Livesey, Mr. Dibdin, Professor Vivian B. Lewes, and others. And injury is added to injustice by penalties attaching to the test, by the degradation of the reputation of the Companies and their gas, and by the bar which it interposes (as will be seen) to the advancement of a cheaper supply sufficient in illuminating quality for existing purposes. The Committee realized that the Companies had a grievance; and, applying as nearly as possible to their act the aphorism *in medio virtus*, they imposed upon the Companies the Departmental Committee's prescription, and (as already stated) extended the average of the test for penalties over three days. The concession is the condemnation of the test. It is the recognition of an injustice, and of

the increased burden thrown by it upon the 14-candle gas Companies. Furthermore, the concession, being applied to all three of the London Companies, accentuates the injustice of the test as between the South Metropolitan and Commercial Companies on the one hand and the Gaslight and Coke Company on the other. For while the 16-candle gas of the Gaslight and Coke Company is tested in a manner which gives to it its "best value," they are to enjoy the relief of the three days' average precisely the same as the two 14-candle Companies, whose gas is not to be tested so as to ensure the realization of its "best value," and for whom the Committee specially intended the relief.

To this question of testing was due entirely the withdrawal by Sir George Livesey of the clause that bid fair to carry his programme another step forward, by conferring on the South Suburban Gas Company the right to supply 13-candle power gas. Sir George has met with very fair encouragement in the House of Commons in his campaign for liberty in the matter of illuminating power. He was successful in the Commons on the last occasion; and Mr. Cawley's Committee were, it was clearly seen, distinctly favourable to the granting of what he desired. But there was another thing equally certain—that they, in granting the 13-candle gas, intended to consign it to the same test as that they had laid upon the London Gas Companies. The question arose if a gas of 13-candle power by this method of testing was to be reputed gas of 14-candle power, what allowance was to be made under the same test for a gas bearing the statutory description of 13 candles? The absurdity, hollowness, and mischievousness of the whole thing were shown when Professor Clowes, the arch-advocate of uniformity of method rather than uniformity of real and relative value, admitted that a 13-candle gas tested by that method would be returned as 10 to 10½ candles, the former of which was the figure cited by all the witnesses for the Company. After giving the matter full consideration, and allowing the discussion to proceed, to see whether there was any hope of obtaining the 13-candle gas on a fair testing basis, Sir George withdrew the clause. We know that it may be stated that he did this, first, because of his conviction that the lower the descent in illuminating power, the more pronounced becomes the wrong inflicted by this fallacious test; and, secondly, because he would not accept a test so wrong in principle for the South Suburban Company and for 13-candle gas which could be used as a precedent against others who may apply to Parliament for power to supply gas of that or of any lower quality. We are glad Sir George took this action, as it is the strongest protest he could have made against the test, and it has lightened the task of dislodging it. The next time the Company come to Parliament on a like errand, we hope that Sir George will have at his back the whole gas industry, supporting the demand for a rational test for all gas below 16-candle power. Whatever a man's views may be on the question of illuminating power, he cannot fail to recognize that it is to the interest of all that, as early as possible, the mistake made by Parliament in accepting this particular recommendation of the Departmental Committee should be rectified.

On the question of abolition of penalty testing for excess of sulphur other than sulphuretted hydrogen, it is satisfactory that the Committee declined to adopt the proposal of the London County Council that penalty testing should be held in suspense, and be subject to reimposition by the Board of Trade in the event of any means other than by the use of lime being devised for the removal of sulphur compounds. Although, testing for the latter is to be continued, and the results recorded, that is a phase with which the companies need not greatly concern themselves. They are not likely to "run riot" in their new-found freedom, but will assuredly exercise at least as much vigilance in the selection of carbonizing material as heretofore. Whether it will be deemed desirable to continue to remove carbonic acid by means of lime, if at all, necessarily depends upon the value which is put upon its removal for increasing illuminating power. There can be no objection to the use of lime for such a purpose, seeing that in the form of carbonate, it is practically inodorous. The only question which has to be considered, therefore, is that of economical advantage. Lime, however, is not the only available agent for the removal of carbonic acid. Great hopes were at one time entertained of ammonia as a purifying agent; for, after lengthy trials of it by Hills and others, Claus succeeded (on an experimental scale) in effecting complete purification by its means. The process which was described in the "JOURNAL" last year by Mr. Thomas Holgate as having been applied by him at the Halifax Corporation Gas-Works, may be described as the survival of those hopes. This makes no pretence to complete purification, but is employed simply as a means for reducting lime and oxide purification, and, as such, it may now be worth consideration. But whether this be so or not, the Companies (including the South Suburban) are to be heartily congratulated upon being within measurable distance of relief from restrictions which it is not too much to say have been more burdensome to them than any other detail of manufacture or distribution, without being of the least benefit to the consumers, but rather the reverse, for they have had to pay for them in the increased cost of manufacture which these have entailed.

Departmental and Select Committee Inquiry.

SELDOM or never before has parliamentary action followed so promptly upon a departmental inquiry as in the case of the recommendations of the Board of Trade Committee on gas testing in the Metropolis. That the Board of Trade itself should not have taken steps to secure enactment of the recommendations of its own Committee is one of the anomalies of a system of government which leaves much to private initiation. This, however, has its compensations. In most cases, inaction on the part of a Governmental Department gives time for public opinion to form and crystallize one way or the other. In the present case, it has enabled each side to present its views upon the matters in dispute in the form which has appeared to be the most desirable one. Most unfortunately, however, a Parliamentary Committee in a case of this kind, which is almost purely a technical one, is a court of inquiry in only a limited sense. It cannot be expected to go behind or over-ride conclusions of a committee of experts on a subject with which its members are not themselves familiar; and all that can be hoped from it is that they will not suffer injustice to be done.

This limitation the London Gas Companies realized to their cost when they sought to convince Mr. Cawley's Committee of the error of the finding of the Board of Trade Committee in favour of the 5-feet rate of consumption when testing for illuminating power. Whether what has happened might or might not have been avoided by an appeal to the Board of Trade for further investigation, it may be useless now to conjecture. Certain it is, however, that the Companies had very good ground for making such an appeal, seeing that but little of the scientific evidence called on their behalf before the Board of Trade Committee dealt with this particular point. It seems, indeed, to have been almost taken for granted before that Committee that the recommendations of the previous Departmental Committee—viz., that of 1895—would have been upheld, and the 16-candle illumination adhered to. At the same time, it must be remarked that the Board of Trade had been furnished, in the shape of the memorial from the Institution of Gas Engineers—referred to in these columns last week—with ample reasons for instituting, of their own initiative, a further inquiry if they had been so minded. That nothing has been done by them as the result of that memorial is scarcely creditable to the Department. It has, however, been made clear to the latter that the 5-feet rate of consumption will not, and cannot, be accepted by the gas industry as a settlement of the question; and it was therefore desirable in the interests of all concerned that the matter should be reopened.

At the same time, the wisdom of the course taken by the Companies in putting forward what must have appeared to the Select Committee as a new departure, instead of relying upon the method prescribed by the South Metropolitan Gas Company's Act of 1900, is open to question. It was doubtless resolved upon in order to meet the different circumstances of the three Companies; but this apparent abandonment of a position which was a perfectly logical one, and the taking up of another, only (as events have shown) had the effect of playing into the hands of the London County Council. However, this does not excuse the absurdity of the 5-feet rate, which was not long in revealing itself (as is indicated in the preceding article) in connection with the South Suburban Gas Bill. In the meantime, it is quite understood that the Metropolitan Companies will appeal to the House of Lords on this ground; and (as already suggested) it may be confidently anticipated that the Institution of Gas Engineers, having already taken action in the matter, will do all they can in support of the views expressed in their memorial to the Board of Trade.

An "Agrarian Outrage."

On several occasions, gas companies have been entreated in the "Journal" to scrutinize and keep vigilant watch on electricity power schemes. The necessity is well established by present proceedings occasioned by the swoop of electrical promoters on London and its environs. The Gaslight and Coke, the South Metropolitan, and other Gas Companies are in opposition to these promoters' Bills; and all with very good reason—not only on the points of competition and the protection of subterranean property, but in the case of the Administrative County of London Electric Supply Company's Bill against their application for compulsory powers to acquire certain lands in the possession of the two London Gas Companies. It is true that attempts have been made to settle (we believe unsuccessfully) this last named matter; but anyway for effrontery, naked and unashamed, it would surpass the wit of man to invent a more brilliant example. The competition alone threatens injury direct and indirect to the Gas Companies; but for the competitors to coolly propose to compulsorily acquire the lands which the Gas Companies now hold by statutory authority for the purposes of their business, upon which to set up electricity generating plants, is a piece of insolence which would really occasion amusement, were it not for the trouble to which it submits those who have to protect their property and rights, and to which they ought not to be exposed. For two of their stations, the Administrative County of London Company set their eyes on a portion of the land of the Gaslight and Coke Company at Fulham, and of the South Metropolitan Company at East Greenwich, for the reason that they have special value in their respective situations for manufacturing operations, which happens to be the precise reason that finds the Gas Companies in question in possession. The scheduling of the land by the Electricity Company is a compliment to the wisdom of the Gas Companies; but compliments do not compensate for expropriation. A further compliment has been paid to the Gas Companies in the confession of the promoters of this colossal scheme that their project of generating-plant concentration, as a potent factor in cheap production, has for its prototypes Beckton and East Greenwich.

However, on the proposal to compulsorily acquire a portion of the East Greenwich land of the South Metropolitan Gas Company hangs a tale. The land forms part of the site for extensions of the East Greenwich works, and for which the Company obtained powers of purchase in 1902. But the serviceability of the land is depreciated by the want of a sufficiency of foreshore; and the necessary foreshore is a possession of Messrs. Redpath, Brown, and Co., Limited. It will be within the recollection of those who followed the acute struggle of the South Metropolitan Company for this foreshore in 1902, that it was represented that parting with it on almost any terms would be next to ruinous to the business here of the above firm; and the Committee who considered the Bill declined to interfere with their property in it. Nor would Messrs. Redpath, Brown, and Co. give the South Metropolitan Company pre-emption, in the event of their wishing to dispose of it. The Agent for the firm, who gave the principal evidence on their behalf, was Mr. Falconer. It is curious to observe that a Mr. Falconer is interested in the promotion of the Administrative County of London Company's Bill; and, if the position is correctly understood, the Electricity Company are not experiencing any difficulty in obtaining precisely what the South Metropolitan Gas Company required in 1902, and what was sworn to be so essential to the life of the firm in possession. How singular the evidence of 1902 reads in the light of the present proposals! If the Board of Trade Electricity Supply Bill had passed last session, its one feature of usefulness to gas companies—thanks to the intervention of the Gas Companies' Protection Association—would unquestionably have been of assistance in this case to the Gaslight and Coke and the South Metropolitan Companies. The protecting clause—though applying specially to Provisional Orders granted by the Board of Trade—which the Association were instrumental in obtaining, disallowed the compulsory acquisition of land which, at the date of the first publication of a notice of an Order, belongs to any gas undertakers, and is used, or is authorized to be used, by them for the purposes of their undertaking.

Concerning the other matters upon which the Gas Companies are opposing, that, in the first place, of pipe protection naturally assumes greater importance with the growth in magnitude of the distribution of electricity. With regard to competition, it is direct in the matter of power supply and also to the extent that power users are to be permitted to use the current for lighting. But there is another aspect of the question. The Gas Companies as large ratepayers have—however much they dislike municipal trading—an interest in assisting in preventing anything (so long as in rendering assistance they do not prejudicially affect their own immediate concerns) which will have a destructive effect on these municipal undertakings. Bad as rate-aided municipal competition with private enterprise may be, it would be madness to sit still when outside competition threatened the municipality, which, if successful, would bring further ill through the rates upon the private enterprise. Of course, the weight of the argument will vary according to whether or not the Bermondsey or Northumberland clauses have been applied.

The Court of Referees and the Gas Industry.

Mixed counsels prevail in our Legislature, which mistakenly or otherwise some of our Continental friends are pleased to hold up to their own Governments as a pattern of what a governing body ought to be. A big inquiry is held into the subject of municipal trading; and we learn of the frightful pass to which we have arrived in respect of municipal expenditure. We hear of the Local Government Board cutting down the period for the repayment of municipal loans, and refusing loans when they are required for every scheme that bears the aspect of being ill-advised or too speculative. Select Committees, too, of the House have acquired the habit of substantially reducing the capital requirements introduced into Bills by Municipalities. All this is done for the protection of the ratepayers, and to put the brake on municipal extravagance. Yet we find the Court of Referees taking a very high-handed course when one of the largest, if not the largest ratepayers of a district—that is to say, the Gas Company—applies to them for *locus* as ratepayers, for protection, and on the ground of competition. The Swansea Gas Company recently obtained *locus* on the question of main protection; but that was all. And now Messrs. R. W. Cooper and Sons and their clients have grave cause of complaint in a case heard last week, in which the Court of Referees exercised their powers in a manner which cuts from the Gas Company concerned all hope of being heard on any matter appertaining to municipal expenditure and operations of a character in which the Company are intimately concerned as a heavy ratepayer, a competitor, and as an industrial undertaking with mains carrying gas, and therefore mains which require proper treatment in order to protect their owners and the public against the possible consequences of acts of the District Council. A Gas Company have no vote and no means of being heard locally on municipal matters; and the Court of Referees now appear to be exercising, in a most arbitrary way, the power of saying to Gas Companies, "Nor shall you be heard by Parliament on municipal matters, though you are large ratepayers, any more than we can help."

The Aberdare Case.

The case referred to in the preceding paragraph is connected with the Aberdare Tramways Bill, which has for its object the construction of electric tramways, the making of certain street improvements, and an extension of the Council's electric powers. The Aberdare and Aberaman Gas Company went to the Court of Referees and asked for *locus* on the three grounds of competition, protection from interference with mains and pipes, and as ratepayers. In regard to the application for *locus* as ratepayers desirous of preventing extravagant expenditure, a precedent was found in the Wolverhampton case of last year, although it is true that the Swansea Company were refused *locus* as ratepayers this session. The point of competition is perhaps not a strong one; but in the matter of protection of pipes, after Swansea, it was regarded as certain that the Court would allow it. But to the astonishment of everybody, without even hearing Counsel for the Bill, the *locus* was disallowed. Encroachments on, and interference with, existing underground works of supply companies are becoming a serious matter; and has it now come to this that those companies are to have every opportunity of securing adequate

protection shut from them? It is said that the Tramways Act of 1870 affords sufficient protection. It does nothing of the kind; and we cannot see how the Court of Referees or anyone else can so contend. That Act only contemplated horse traction, and not the heavy impervious construction that is now the vogue in connection with electric tramway working, and which construction necessitates a great deal of interference with underground pipes, to say nothing of the injury to which those pipes are exposed by stray electric current. And if injury is done to the mains, the work of repair is a vastly different thing from what it was in the days of the old horse trams. Moreover, the impervious character of the construction of the track allows, in the case of accident, the gas to travel over long courses before it gains exit; and then comes the trouble of finding the leakage. The difficulty of tracing leakages of this kind through the modern methods of other people, and yet the ease with which Gas Companies may be mulct in damages for injury, are illustrated by the recent case of *Ogden and Another v. The Gaslight and Coke Company* as reported last week. The danger is increased in a mining district such as Aberdare, where pipes are subjected to frequent subsidence. Everything points to the absolute necessity of Gas Companies seeking to obtain some more efficient protection than is afforded by an old Tramways Act passed 35 years ago, when the conditions were altogether different from existing ones; and pressure must be brought to bear on the authorities to take a more considerate view of the position of such Companies than that of the Court of Referees in this Aberdare case, in which, we maintain, the Gas Company were not justly dealt with. It is certain that the matter cannot rest here.

Gas Supply in Germany.

The outstanding feature of the report of the German Continental Gas Company for the past year (which is noticed elsewhere to-day) is the statement it contains regarding the concessions extended or arranged during the past twelve months. As these are equivalent to 6½ per cent. of the present business of the Company, the satisfactory conclusion of the negotiations is sufficient to ensure the prosperity of the undertaking for a long time to come; for, taking into account other renewals secured within the last few years, no less than 82 per cent. of the output has in this manner been safeguarded. Considering the troublous times that have been experienced at Warsaw (which place accounts for more than 50 per cent. of the output of the Company), and that the works at another place have been ceded to the Municipality, the shareholders will doubtless agree with the Directors that the very trifling decrease of 0·67 per cent. in the total output is exceedingly satisfactory. In the light of later events, it is of interest to recall the opinion expressed in last year's report of the Directors, that, "having regard to the great resources of Russia," they did not anticipate any serious results to the gas supply at Warsaw from the Russo-Japanese conflict. It is to be feared that, whatever may have been the effect so far on the gas supply of the town, the Company, in common with most other people, over-rated the resources of the Government, if not of the country. It is to be noted that the proportion of the make used for power and heating purposes (22·21 per cent.) is a little less than it was in the previous year, when the figure was 22·53 per cent.; but the falling-off in the consumption for these purposes (such as it is) follows upon a very substantial increase in the two previous years. In spite of the necessity which unfortunately arose of purchasing a quantity of more expensive coal than usual, the profit for the year was considerably greater (4·2 per cent.); and, unlike the vast majority of English works, this excellent result is mainly due to higher prices having been obtained for coke and ammonia. The dividend remains the same as for the two immediately preceding years—10 per cent.—which cannot be regarded as being otherwise than highly satisfactory, though it is true that there were still larger distributions for the two years before that. Brief mention is made of the Bueb system of vertical retorts, of which it is hoped that some favourable results may be published during the present year. On this occasion, the staff, as well as the shareholders, have a material interest in the report, which, as will be seen, proposes that a large sum shall be voted to the staff reserve fund in commemoration of the Company's jubilee, which was celebrated with a considerable amount of ceremony a fortnight ago, as duly recorded in the "JOURNAL."

The Devonport Controversy.

After talking about it for four hours, the members of the Devonport Town Council, as will be seen from the report given elsewhere, separated last week without coming to a decision upon the question of the desirableness of adopting either "straight" water gas or carburetted water gas. There was a good deal said in those four hours which had little to do with the merits of the two systems which had divided the Gas Committee into irreconcilable partisans, and caused a breach between a majority of the Committee and their scientific advisers. The rival sections abused each other over the conduct of the preliminary proceedings. One party was angry because the other showed too much deference to the views of the Engineers who were engaged to advise the Committee in the remodelling and reconstruction of their works; while another abused the majority of the Committee for their arrogance in presuming to know more about mere technical affairs than those who have devoted a lifetime to the study of such matters. Between the two, the Engineers stand in a very unfortunate position. By a resolution of a majority of the Council, the Consulting Engineers were deliberately excluded from the meeting. The Resident Engineer, though present, was even more unfortunately circumstanced. He could hear all that was said—whether complimentary or the reverse, whether wise or foolish—without having an opportunity of uttering a word in explanation or refutation. It is to be hoped that before the discussion closes the members of the Council will come to see the injustice and folly of the position they have taken up. Even if it be assumed that the majority of the Gas Committee are right in the preference they have shown for one system of water gas practice over another, this can hardly be a good reason for depriving the Council as a body of the advantage of the advice of the gentlemen who have been engaged to assist them in arriving at a decision on such subjects. A more important point raised during the debate was that of the wisdom of proceeding with the extension of the works of which this water-gas installation is only a part. More than one of the speakers deliberately challenged the Gas Committee's general policy. It was alleged that the reconstruction scheme is modelled on too large a plan; that the cost is likely to exceed the original generous estimate of £100,000; and that the expectations of a considerable increase in the demand for gas in the immediate future are likely to be found a disappointment. These are matters upon which the Engineers ought to be heard before the Council are committed to a decision one way or another. It is true that the Committee will shortly lose a large, if not profitable, customer in the Admiralty. It does not, however, follow that this ought to lead to a modification of the extension scheme. The fact that the Admiralty intended to lay down an electric lighting plant has been well known for several years. It, no doubt, entered into the original calculations of the Engineers and the Committee, and has been duly taken into account. Whether it has or not, the situation is clearly one in which the members of the Council can gain nothing by depriving themselves of skilled advice, and are certainly more likely to find they are in the wrong than in the right, if they act on the suggestions of amateurs who, however well meaning, are not fitted by training and experience to take comprehensive and far-sighted views of the circumstances.

Invidious Distinctions.

For a long time past some of the smaller municipalities have cast eyes of envy on their bigger brothers—not because they are bigger, but because, being bigger, their stocks enjoy the proud distinction of being numbered among the Trustee Stocks. The explanation of this sad state of affairs is that trustees are not now permitted to invest their funds in the loans of towns having a smaller population than 50,000, which might be taken in some quarters to convey a hint that the stocks of places coming below this limit do not constitute a "gilt-edged" security. However this may be, the question has for some years occupied the attention of the Association of Municipal Corporations, at the last autumn meeting of which the Town Clerk of Blackpool moved that the Council should be requested to again consider the best means of promoting and carrying through Parliament the Bill adopted by the Association with respect to an amendment of the law as to trust investments. Presumably as the result of this, a Bill has just been brought in by Sir Albert Rollit and Sir James Woodhouse, and is down for second reading to-night. The object

of the Bill is to make the securities of all municipal corporations that are charged on the rates, whether in the nature of a stock or otherwise, trustee investments; and the emissions of joint boards —such as water boards—if one of the constituent members of the board is a corporation or a county council, are also included. Considering the stir that is now being made on the subject of the expenditure of our local governing bodies, the present time does not appear to be particularly opportune for the introduction of such a measure; but perhaps that is not Sir Albert's fault. The proposal is one that needs the most careful consideration (and we have not the slightest doubt that it will get it); for the varying treatment which has been accorded different municipalities on their endeavouring to raise money would seem to show that some sort of distinction is made by financiers between one place and another. This being so, it is only natural that Parliament should fix some limit in regard to trustee investments. But whether a hard-and-fast line at a population of 50,000 is the best method of doing this, is a little more open to question. If it should be agreed that population is not a proper basis to go upon, why not take as the sole standard the amount of debt per head of the population not covered by readily realizable assets? This would doubtless be open to some objection; but it would be an incentive to the borrowers to keep within bounds. As an alternative, the amount in the pound levied as rates might possibly prove a workable basis for deciding whether or not particular stocks should rank as trustee investments.

The Law as to Trade Marks.

In the House of Commons on Monday last week, a Bill introduced by Mr. Fletcher Moulton, K.C., to consolidate and amend the law relating to trade marks, and to dissociate it from that which refers to patents and designs, was read a second time and committed. As some of our readers are interested in the subject dealt with by the Bill, the progress of which is, we learn, being watched with "benevolent attention" by the Board of Trade, it may be useful to indicate the principal objects its framers have had in view. In the first place, they are endeavouring to make the legislation which defines the essentials of what are called "registrable" trade marks and the procedure for registering them accord more closely with the wishes and needs of the commercial community. Secondly, they desire to separate the fundamental provisions of that legislation from those relating to procedure; the latter being made more elastic, and capable of being readily modified as experience shows best. Finally, they wish to correct defects in the working and arrangement of the present Acts, so as to render the legislation simpler, more intelligible, and more effective. The following are some of the chief points in the Bill. The provisions as to registrable trade marks are made wider, so as to embrace many types of marks which have hitherto been excluded from registration. The vexed question of disclaimers, which has led to much litigation in the past, is dealt with; and great freedom is given to the tribunal to require such disclaimers as are necessary to define the rights acquired by the registration. Another feature of the measure is the attempt to secure for the commercial community that a trade mark which has been registered for five years shall be treated by all Courts as valid; while with regard to legal matters, it is intended to do away with the double procedure by motion and action, and enact that the rights of the parties shall be dealt with in one proceeding. In the preparation of the Bill, of which the foregoing is the merest outline, the promoters have endeavoured to ascertain the views of those who are most interested in trade marks; and it is believed that they are embodied in the measure which has been submitted to Parliament.

At the meeting of the London County Council last Tuesday week, Mr. E. A. Cornwall was elected Chairman; Mr. Evan Spicer and Lieut.-Col. Probyn being chosen to fill the offices of Vice-Chairman and Deputy-Chairman.

In consequence of the continued serious illness of Mr. James Mansergh, which has incapacitated him for some time, the Stockport Water-Works Committee have appointed his son, Mr. Ernest Mansergh, to be Engineer of the Stockport water scheme at Kinder. Mr. Ernest Mansergh has acted for his father in connection with this scheme, and has so far carried it out.

NOTES FROM WESTMINSTER.

[For Parliamentary Intelligence, see p. 846.]

THE proceedings last week on the group of London Bills, and the similar one of the South Suburban Company, were full of incident. The "Notes" published last Tuesday portrayed the position of affairs up to the close of the previous day's sitting, when, practically speaking, the Bill of the London County Council and the joint one of the three Companies had been disposed of, except on the testing question and the penalty clause in respect of default on the part of the Companies in complying with any of the requisitions of the Gas Referees. The proceedings before the Committee were split up into small pieces in a marvellous and unusual manner—the Committee having apparently set for themselves the guiding rule of discussing only one subject at a time, mastering the point, if by a lay mind it could be, whether they mastered it or not to adhere as closely as possible to the report of the Departmental Committee, and to show the Companies where possible that outside the report of the Committee they felt for them some sympathy, but that it could only find tangibility (owing to the report before them) to a very limited extent.

The Testing Decision. Departing a little from the course of the proceedings, in order to put readers in possession of the result of the outstanding questions on the County Council Bill, one of which was of prime importance to all concerned, we must turn in the first place to the afternoon sitting on Tuesday. Then the Committee delivered themselves of the most unexpected, and being unexpected strange, decisions on the point of the test to be imposed on the London Gas Companies supplying 14-candle gas. The proposal of the London County Council, based on the report of the Departmental Committee (which very strenuous efforts were made to overthrow), was that the 14-candle gas should be consumed in the "London" No. 1 argand at the rate of 5 cubic feet, so as to produce a light equal to 13 candles, and this should be taken to satisfy the requirement of the South Metropolitan Act of 1900 and of the Commercial Act of 1902 that the gas should be equal to 14 candles. The gross injustice which this does to the Companies and to their commodity is well known in the gas industry, and was the subject of much of the evidence and comment printed in last week's issue. What the Committee have done is to make this test apply not to the average of a single day, but to the average of the tests of three days before the Companies can be penalized. The Companies have accepted this; but their acceptance is somewhat tantamount to Hobson's choice. It, however, gives the Companies scope; and there is a particular virtue in this which was not contemplated by the Departmental Committee. At the present time, as is well known, the average of three tests a day is taken. If the average is below the statutory illuminating power, a fourth test is made; and the average of the four applies. Therefore, under the Committee's decision, the average of nine tests must be taken; and, if the Gas Referees do not ordain otherwise, the Companies will, with the advantage of the fourth test, have the right to an average of twelve tests during the three days. In view of the unfairness of the 5 cubic feet rate for gas of lower power than 16 candles tested in the No. 1 "London" argand, they ought not to have taken from them, if required, the increased protection of the fourth test. As we understand the decision of the Committee, their view is that the Companies ought not to be placed, under the fixed 5 cubic feet rate, in a worse position per day than at present, and that they shall have the right to an average of three days in all respects the same as existing conditions, with the limitation of the consumption to 5 cubic feet. The concession of the three days is certainly an appreciable one on the Departmental Committee's recommendation; but it is not the test that the Companies are entitled to, it is not a common-sense test, nor is it supported by the highest scientific opinion. But there it is, and the best must be made of it, unless in the Upper House some modification can be effected on clauses, or until, if experience proves it unworkable or unfair, a further appeal is made to Parliament for its modification. Of course, the decision has had the effect of putting the Gaslight and Coke Company, with their 16-candle gas, in a better position than they were in previously; and, comparatively, the other two Companies in a worse situation than they before occupied relatively to the largest Company. It was made clear to the Committee the following day that while the decision of the Committee had been accepted by the Companies, it must not be taken that they had accepted the principle of the test prescribed. Regarding clause 16, which also stood over for decision, the wording has been extended so that if any one of the Companies neglect or refuse to comply with any prescription or certificate of the Gas Referees on which an appeal has not been made to the Chief Gas Examiner, or neglect or refuse to comply with any prescription or certificate of the Chief Gas Examiner, they are to be liable on summary conviction to a penalty not exceeding £50 for each day during which the neglect continues, provided, Mr. Freeman (for the County Council) was prepared to add, that no proceedings under the section are taken except with the consent of the Board of Trade. Clause 10 provides for a month within which an appeal can be made to the Chief Gas Examiner; and the inconsistency of this with clause 16 was made the subject of further conference. Under these circumstances, on Wednesday morning, the preamble of the County Council Bill was declared proved, and that promoted jointly by the London Companies not so.

The Gas Referees to Live.

The composite Bill of the South Metropolitan Company was the one under consideration on Tuesday morning; and the part of it of superlative interest and importance was that which provided for the disestablishment of that unnecessary body the Gas Referees from their supervisory state in the much-controlled Gas Supply of London. There is the Chief Gas Examiner, the London County Council, and the army of Examiners; and, in addition, there is this embodiment of pedantry, the Gas Referees. It was rather a pity that this Bill (through its accidental position in the list) was considered after the London County Council Bill, as the clauses passed by the Committee on that Bill, providing for certain prescriptions by the Gas Referees, gave the County Council ground for raising early in its consideration a technical objection, such as lawyers are pleased to be able to lay hold of. The County Council were the principal opponents, and they were supported by other authorities, while the Camberwell Borough Council were in evidence on some other parts of the Bill. Confining ourselves first to the question of the retirement of the Gas Referees, from Lord Robert Cecil, in his opening, was heard one of the finest arguments that fell from him during the whole course of these proceedings. He showed a complete appreciation of the position—of the violation of the law that has been going on since 1872 in respect of the Gas Companies' right to have in the constitution of the Referees (all three being competent and impartial persons) one at least with practical knowledge and experience in the manufacture and supply of gas; and of the hardship that has been laid upon the Companies by the finical requirements of these three academical gentlemen. Lord Robert availed himself of the opportunity of illustrating both the severity of the requisitions and the extreme refinement which the laboratory imposed upon the commercial undertaking; and he enlarged upon this, that if in 1868 there was for such a body as the Gas Referees a substantial *raison d'être*, it could not be claimed that there was now. The burner, the testing-places, and the ammonia test have been, he argued, determined and standardized; and as to sulphuretted hydrogen and the other sulphur compounds the tests of the Referees have now been over-ridden. Then the perpetual variations made by the Referees have been a constant source of worry and anxiety to the London Gas Companies; and from year to year they have never known what new discouraging imposition would emanate from these official gentlemen—no doubt impartial, but scarcely "competent," being without "practical knowledge and experience in the manufacture and supply of the gas"—who occupy the position of Gas Referees. The point was also brought clearly before the Committee that the application of all this science and rigour to the London Companies was unique; for there was no body with similar powers of prescription for the rest of the country, and still greater freedom obtains on the Continent. And it will continue to be unique while an industry with a commercial ideal is dominated by Referees having a purely scientific ideal. "You have, for the gas industry," said Lord Robert in a telling and finely-rounded period, "the best form of restriction that has yet been devised by human ingenuity—viz., the competition of other agencies which are well able to supply the want that gas is designed to do." Friction and discouragement have been the experience of refereeism, and it has alienated confidence. With the exalted position of the Chief Gas Examiner under the condition of things which has arisen through the Departmental Committee's report, there is ample control of the Metropolitan gas industry. The inconsistency of the South Metropolitan Bill with clauses in the County Council Bill which specifically cites the Gas Referees as the prescribing authority, was urged by Mr. Freeman in opposition. The objection was met by a provision in the former Bill empowering the Chief Gas Examiner to take over the Referees' duties. There was a consultation by the Committee in private; and it was announced by them afterwards that, unless Lord Robert could carry the case for abolition a great deal further than he had done, the Committee could not entertain the Company's proposition. Sir George Livesey did clearly carry the matter further by his evidence. One thing he made perfectly plain, that he had no desire to get into conflict with the Board of Trade over this matter, and preferred to take an independent course in his endeavours to disestablish a superfluous body that was brought into being nearly 40 years ago. On the point as to the Referees being illegally constituted, Sir George volunteered the statement that the Board of Trade have found extreme difficulty in selecting a gas man to comply with the decree of 1868. It is necessary that such a man should be impartial; but, asserted Sir George, "all gas men are committed one way or the other." But events have shown—and this Bill is the confirmation—that this ought not to be quietly accepted in extenuation of non-compliance with the law, which non-compliance is in all probability largely answerable for the points which made, in the proceedings on this Bill, a rather formidable impeachment of the Gas Referees. The Committee still agreed to allow the Referees a further span of life.

Rehousing, Rateability, and Gas-Engines.

The morning sitting on Tuesday ended with a triangular wordy duel between Lord Robert Cecil, Mr. White (for the Camberwell Borough Council), and the Chairman, on three matters raised by the remaining clauses of the South Metropolitan Bill. The wants of the Borough Council all extended beyond the general law, and therefore meant (if conceded) the conferring upon them of preferential powers. In the first place, they asked for a special clause as to the rehousing of people who will at some future time be displaced from a few cottages existing on land which the South Metropolitan Company are proposing to acquire. The Committee did not think that the matter was big enough for them to specially interfere with. Then the Council sought for some special enactment as to the rateability of the area, in order to ensure that it shall not be non-productive to the Local Authority, so long as the undertakers think fit to leave it in a state of sterility. In the opinion of the Committee, this was a matter (if it required dealing with at all) that should be the subject of a General Bill. The third question was one of great importance to gas suppliers. The Bill contains a clause providing that all gas-engines, fittings, and appliances let by the South Metropolitan Company on hire shall, notwithstanding that they are fixed or fastened to any part of the premises in which they may be situated, or to the soil, at all times continue to be the property of, and removable by, the Company, providing that there is some indication on the engines or other apparatus that the Company are the owners. The point is this, that if, through the fixing of these things, they become part of the freehold, and the freehold is mortgaged, they pass as part ot the freehold, and may be taken from the Company. This it was contended is unfair; and it is to provide against this that the Company inserted the clause in the Bill. But what the Borough Council asked was that the proposal should be reversed—that these engines or other apparatus should be made liable for distress for rates due from the occupier. The Borough Council, in fact, were seeking for something which they do not possess under the existing law, where gas-engines or other appliances are fastened down, and thus become part of the freehold; so that their position as the local authority would not be affected by the clause. The Company, in short, were only securing exemption from the legal liability which comes from the fastening of the apparatus to the freehold. The Chairman evinced a very practical acquaintance with the position; and the discussion ended in the Committee granting the clause, with the addition of a provision offered by Lord Robert that nothing in the section should affect the amount of the assessment.

13-Candle Power Gas.

All present in the Committee room on Wednesday morning anticipated the day's proceedings with the keenest relish; for the first matter in hand was the discussion of the principal proposal in the South Suburban Gas Company's Bill—the reduction of the illuminating power of the gas to 13 candles. The Bill is one which irradiated the progressive spirit of the protagonist of the gas industry; but it is a thousand pities for the industry that he has not had an opportunity of taking the step which he has now twice essayed in Parliament (and is going to try again) in connection with a gas supply removed from the petulance and obstructiveness of the London County Council and the authorities that come so much under their domination. Fourteen candle gas was the first step; 13 is intended to be the second; and perhaps the end of it all will be that "illuminating power" will be a term that will be for all but academic purposes banished from the nomenclature of the gas industry. Sir George Livesey, the Chairman of the South Suburban Company, was in good fighting mood, and he had with him his colleagues of the Board, Mr. Charles Hunt and Mr. Robert Morton. There were also present Mr. S. Y. Shoubridge (Engineer) and Mr. Charles M. Ohren (Secretary); with Mr. E. H. Stevenson, Professor V. B. Lewes (on an order of the House), Mr. Dibdin, Mr. Otto Hehner, and Dr. Samuel Rideal. The legal representatives for the Bill were Mr. Balfour Browne, K.C., Lord Robert Cecil, K.C., and Mr. L. Rostron. Backing Counsel for the opposition were Mr. W. A. Valon, Professor Clowes, and Mr. W. J. A. Butterfield. Counsel on this side were also plentiful. There were Mr. Freeman, K.C., Mr. Courthope-Munroe, and Mr. Adkin, for the County Council; Mr. Vesey Knox and Mr. A. M. Paddon for various authorities distinguished like the County Council for their ill-advised hostility to the Company's progressive policy which has been framed mainly in the interests of the consumers; and the Croydon Corporation were also represented. Procedure on the Bill was characterized by taking the measure piecemeal as in the case of the previous Bills; and though it is rather an uncommon course in the Committee rooms, it had the merits of expediting decision, and of tending to maintain from confusion the different issues involved. While, from asides, it was gathered that opposition Counsel regarded this as peculiar, all the peculiarity was not on the side of the Committee. Eccentricity darted frequently from irrepressible lower lights of the Bar; and while this did no harm to the Company's cause, it made a little diversion. However, it was 13-candle gas that the Company asked for; and Lord Robert Cecil spread before the Committee all the reasons of which readers of the "JOURNAL" are cognizant as to why illuminating power under the present conditions of using gas for lighting, heating, cooking, and motive power is not the thing required, but the need is for the cheapest gas most suitable for this variety of purposes. The Company were prepared to reduce their initial price with its neutral zone between 2s. 10d. and 3s. 2d. to 2s. 8d. to 2s. 10d.; and to increase the increment of dividend from 2s. 6d. to 3s. 4d. The result of this would be that not until the price went down to 2s. 2d. per 1000 cubic feet would the proprietors receive the same dividend as now. There was every indication that the Committee were favourable to the granting of the lower power gas. But the hideous question of testing soon came into view; and this was the rock upon which

Sir George and his colleagues saw the ship would be wrecked if they did not for a year at any rate return to port. The testing clause the Company had put into their Bill specified the 3½-inch flame; and in this connection the last issue of the "JOURNAL" was put in, containing the memorial of the Institution of Gas Engineers to the Board of Trade. But the Company were prepared with an alternative: The No. 1 "London" argand, consuming gas at the rate of 6·4 cubic feet per hour, and thus giving a 16-candle flame; then converting back to obtain the standard of 13 candles at the 5 cubic feet rate. But while the Committee evidently looked with benignant eye on the proposed reduction of the illuminating power, it was apparent that they wished in some manner to apply to the South Suburban Company the dictum of the Departmental Committee in the matter of testing. The County Council were prepared to accept the 13 candles if the gas was ordered to be tested the same as in the case of the London Companies, with a reduction of 2d. in the standard price. But Sir George had an objection to the testing prescription of the Departmental Committee being applied to 13-candle gas, seeing that such gas (as shown by Mr. Dibdin's diagram published last week) would have to be described as of 10-candle power. He urged that this system of testing should be made a matter of experiment on the working scale for twelve months; and whatever the issue, it could be provided for in an agreed clause. The idea did not find favour. Professor Clowes very correctly stated that by the Departmental Committee's system of testing (which he thought fair "in the sense that the Departmental Committee spoke of testing") the 13-candle gas would come out at between 10 and 10½ candles. Mr. W. J. A. Butterfield laid down the proposition which will find little acceptance that the light obtainable from a flat-flame burner is proportional to the illuminating power of the gas tested by the method which the Committee had adopted in the London County Council Bill. Another point from his evidence was that, in testing, to get the maximum duty from the gas there ought to be a different burner for each quality of gas. The Committee cleared the way a little by announcing that in this Bill they would not be prepared to depart from the principle of the method of testing they had imposed in the case of the London Companies. Then things seemed to get into somewhat of a tangle; and the complete absurdity of the system of testing prescribed by the Departmental Committee was shown by what transpired. While Sir George was sure that the system of testing was the wrong one, he was at first willing to agree to it if, by that system, a return of 10 candles was taken to satisfy the 13-candle standard; and this was moderated to Professor Clowes' 10½ candles. Then Mr. Freeman insisted that this was a reduction of 4½ candles from the existing 15-candle standard, and for that he thought a fair recompense for the consumers would only be a reduction of 5d. in the standard price. Whether or not he sincerely believed this is a matter about which an opinion need not be expressed; but the preposterous proposition will only excite ridicule, and be treated as a piece of legal ingenuity intended to muddle the Committee. An attempt was also made by the learned Counsel to get the South Suburban on exactly the same lines as the South Metropolitan and Commercial Companies—14 candles at the 5 cubic feet test. Then the Committee heard Professor Lewes assert that the 13-candle gas would only be returned as 10 candles. But the Committee wavered; and what Sir George later on pertinently described as "wrangling" continued. At length he said they would cut the whole thing short by withdrawing these particular clauses. But, he added, "We will come again next year." The principal reason that induced Sir George to take this action is explained in our editorial columns.

Entertainment, Testing, and Sulphur Compounds. The part of the Bill referring to the reduction of illuminating power having been withdrawn, this made a substantial clearance of the matter which the opposition could effectively lay hold of; and a short sitting on Thursday enabled the remainder of the Bill to be discussed and adjustments made. Mr. Paddon was much in evidence during the morning trying to inveigle the Committee into admitting the circular issued by the Board of the Company to the consumers last year, and to allow him to draw attention to how the Company had broken the law. Mr. Paddon did not get any encouragement from the Chairman, who very rightly pointed out that the question of the Company breaking the law had nothing to do with the Committee. The Local Authorities had their remedy in the Law Courts. A less genial Chairman than Mr. Cawley, might not have endured so good-temperedly the pertinacity that Mr. Paddon displayed. In one place, too, the latter asked Sir George Livesey whether he would abide by the law until he next came to Parliament. Both question and manner of putting it greatly disturbed the serenity and gravity of all present. He sought for what he termed a "parliamentary" pledge on this matter in respect of illuminating power; but the Chairman appealed to Lord Robert Cecil, and Lord Robert ferretted about among his own store of parliamentary knowledge, but the interpretation of what is a "parliamentary pledge" was not forthcoming. The Lewisham Council also in a paper which was handed to the official shorthand writer said they "must" not be prejudiced by this Bill in the matter of the appeal to Quarter Sessions in respect of the sulphur case recently heard at the Greenwich Police Court. However, there was much argument on some of the remaining clauses in the Bill; but the result possesses the main interest. The section as to the Company being given a margin of ½ candle in respect of deficiency of illuminating power was modified by Sir George to fractions of the first ½ candle, with the maximum penalty being imposed at the ½ candle. The Committee eventually removed the clause; being of opinion it formed part and parcel of the illuminating power question. But they made it clear, in announcing their determination, that they did not base it on any consideration of the merits of the question as to the ½-candle margin. The Company also obtain relief from the necessity of lime purification by the abrogation of section 17 of the Company's Act of 1873 and section 28 of their Act of 1893; and in this respect, as soon as the Bill and that of the County Council reach the dignity of Acts, the London and South Suburban Companies will be equally free from this restriction. Croydon endeavoured to get a testing-station in the part of their district supplied by the Company. But they have access to the Beckenham station which is 2 miles from the gas-works, and doubtless the Committee thought this sufficed, seeing that they declined the application. This finished off the group of London Gas Bills; and it will be seen that, though the Companies have not realized all they wanted, the decisions on the matters referred to the Committee are of the utmost importance to all concerned in the progress of the gas industry.

A Croydon Settlement. Good fortune attends the Croydon Gas Company. In two consecutive sessions, they have been in Parliament with Bills. On both occasions, they were opposed; on both occasions, they have composed their differences by conference without wasting money and laying the foundation for future feud. Of course, this cannot always be done, more particularly where one side takes an uncompromising attitude, and suggests concessions outside the bounds of reasonableness. But at Croydon the personal element and mutual confidence undoubtedly play important parts in this amicable adjustment of their matters parliamentary. The union with the Croydon Company of the Caterham and District Gas Company is the main object of the Bill this session; and various authorities lodged petitions on several points. But all obstacle now to the Bill ranking as an unopposed one has been cleared away. The Corporation wished the Company to insert what is known as the "equality" clause, which was drawn up in the Model Bill of last year. The Croydon Company objected to it in this form, but offered to accept a clause providing for a maximum discount of 20 per cent., instead of 10 per cent. and 15 per cent. mentioned in the Model Bill. To this the Corporation have assented, and in turn the Company have withdrawn their petition against the Corporation Bill, in which petition they asked for the insertion of the "Northumberland" clause. With regard to the Rural District Council, whose petition required that the Gas Company should at once reduce the price in a small portion of the Coulsdon Parish to the Croydon price, the parish of Coulsdon has been for some time partly in the Croydon Company's district, and has, therefore, been under their price. The small and unimportant portion, however, was in the Caterham district. It appears that the Croydon Company placed upon the Rural District Council the onus of obtaining the consent of the other parties interested in the Bill; and upon the Company receiving notifications that they raised no objection, they decided to accede to the request. As to the threatened opposition from the Surrey County Council, this was due to their desire to insert a series of very drastic clauses dealing with notices, plans, &c., which should be given when breaking up roads. This the Company have overcome by offering to accept the Kingston clause dealing with this matter, with some very slight modifications.

Settlements and Municipal Loans. The settlement of the differences of promoters and opponents is going on apace. Parliamentary warfare is such an expensive matter that a little give and take is often the cheaper, and not only cheaper, but more certain, process of obtaining what is required. Now that the London Gas Bills have gone through Committee, and are not likely to claim much attention in the Lords, and with the squaring-up of difficulties, the prospects of life in the gas department look more dismal than they did at the opening of the session; and then things were—setting aside the London Bills—of that weakly order that the prophets had no hesitation in fortelling a thin session. The London Electric Bills have come as a "boon and blessing" to the lawyers; and they are hanging on to them with a tenacity that is uncommon in a busy session. The promoters and opponents are fortunate in this. In respect of other Bills, last week saw certain withdrawals of opposition in which Gas Companies are concerned. The Swansea Gas Company retired from their opposition to the Corporation Bill, the Croydon Gas Company (as seen above) freed themselves of hostility, and so did the North Sussex Gas Company. As to the Swansea Bill, the Corporation, before the measure reached Select Committee, withdrew the part relating to street improvements. The Gas Company entered a petition against the whole Bill; but it was arranged with the Agents to the Corporation that clauses protecting the Company's interests should be inserted in the portion of the Bill relating to the extension of the water-mains, and upon this understanding the Company withdrew their petition. The text of the agreed clause appears in our "Parliamentary Intelligence." When the Bill went into Committee, the section relating to the purchase of the tramways by compulsory power, met with severe opposition on the part of the British Electric Traction Company; and the preamble relating to this particular proposal was thrown out. The

question of the repayment of loans has been raised on this Bill; and it shows again the tendency on the part of Parliament to shorten the period. It is one way of putting the curb on municipal expenditure; but there should, of course, be a judicious selection of the departments of municipal expenditure which should bear the curb. The Corporation in this case have part of their water-works loans at 60 years, and part at 30 years, and they are asking for power to borrow further money at 60 years. They also desired, in order to make the periods uniform, that the 30 years should be extended to 60 years; but the Committee struck the clause out. As to the new loan, the Committee considered the period should be a matter of arrangement with the Local Government Board.

Sunderland and South Shields Water. The biggest fight of the session over a Water Bill is likely to be that which was finished last week in connection with the Sunderland and South Shields Water Company. The Corporations of Sunderland, South Shields, and Jarrow, with the District Councils of Sunderland and Hebburn were there in opposition; and the Hartlepool Gas and Water Company were present in defence of their several interests. The populations of all the places named were, judging from the congested condition of Captain Jessel's Committee room day after day, represented in force; and Counsel and witnesses were also there in numbers too numerous to mention by name. The proposals in the Bill did not constitute all the grounds of opposition. The question of softening the water was, however, a bone of great contention—the proposal coming from the Corporations. Something or other has promoted an unusual interest among parliamentary authorities respecting the hardness of domestic water supplies. Now this Company are to be compelled to effectually soften their supply by lime, and clarify it before distribution; and they are allowed three years to make their arrangements for this work. It will, of course, mean a considerable amount of capital outlay and annual expenditure. As the consumers are to have the benefit, the consumers should pay; and the Committee have given the Company power to collect from their area all the expense incurred exceeding ½d. per 1000 gallons. The Company were proposing in the Bill to spend some £575,000 on four new pumping-stations, two reservoirs, and the necessary pipe-lines. It was on the question of the wells that the Hartlepool Gas and Water Company were chiefly in opposition. Their position was that the two southern wells which the promoters proposed to construct would have a prejudicial effect on their own supply; and Mr. Thomas Bower was of opinion that the two northern wells would be ample for the requirements of the Sunderland Company. With respect to one of the wells—at Hutton Henry—the promoters agreed with the Hartlepool Company to insert in the Bill a proviso that, notwithstanding the power conferred by section 13 to temporarily discharge water into any available stream or water course, they should not discharge any water so as to flow into the existing gathering-grounds of the Hartlepool Company, but should discharge, or convey, all such water into such streams as should prevent it from flowing into any of the Hartlepool Company's impounding reservoirs. The capital powers asked for were reduced by £100,000.

Otley and Borrowing Powers. The question of whether the Police and Sanitary Committee will review the decisions of the Local Government Board in respect of the periods of loans was settled pretty conclusively when dealing with the Otley District Bill last week. The water undertaking has unfortunately been an expensive one; and the Council were asking for fresh borrowing powers, and an extension of time for repaying an existing loan. The original estimate for the new water-works was £55,000; and, when completed, the cost will be something like £95,000. The excess of expense, however—this was advanced as a good reason for the extension of the period of repayment—is in that section of the works which will be most permanent. The limitation placed upon the loan already sanctioned by the Local Government Board is 35 years; and the Council now asked for the borrowing of the remaining portion of the loan, and the raising of the period of repayment on both the existing and prospective loans to 60 years. The Committee sympathized with the Council, but would not grant what was desired—pointing out that they did not feel it was within their province to review an order of the Local Government Board. This Bill, it will be remembered, as originally promoted, contained provision for the acquisition of the Gas Company's undertaking; but, as the result of a poll of the ratepayers, this part of the measure had to be dropped.

Thames Harbour Bill Petitioners. London and Suburban Gas Companies were petitioning against the Thames Harbour Bill; and they would be pardoned among other petitioners for raising a protest against the new procedure which governs the period within which petitions against Private Bills have to be deposited. Under the new Standing Order (as has been freely pointed out), petitions must be filed against Bills in the Commons not later than Feb. 7, instead of so many days after the first reading, as under the old practice. The effect of this is, it is complained, that parties have to prepare and lodge petitions in opposition to Bills which may never pass the Standing Orders, nor even the formal stage of first reading. The object of the Bill was to incorporate a Board of Commissioners, representing dock, water-works, and other interests concerned in the navigable part of the river and its tributaries.

THE AMENDING OF THE WORKMEN'S COMPENSATION ACT.

The Government Measure.

CLOSE upon the heels of the Private Bill for the amendment of the Workmen's Compensation Act which was noticed in the "JOURNAL" last week (p. 759) come the proposals of the Government on the same subject. The former measure, which was supported by the Labour Members, was drafted entirely from the point of view of the workman, and apparently without any regard whatever for the recommendations of the Home Office Departmental Committee which was appointed late in 1903 for the very purpose of ascertaining precisely what amendments in the existing law were either necessary or desirable. The latter Bill, of course, embodies the suggestions of the Committee, and therefore due consideration has been given in the framing of it to the claims of employers as well as to those of their men. The result is a Bill which, if it should become law, would in all human probability greatly lessen the amount of litigation arising over accidents, by simplifying the provisions and clearing away the obscurities of the Act of 1897. This, however, though perhaps the main, is not the only object of the measure; an important feature is the extension of the principle of compensation to classes of workers who are not already included. The Bill is a lengthy one, containing 22 clauses; but its consideration is greatly facilitated by a memorandum relating to the existing Acts and the proposed alterations, which has been issued for the purpose of showing exactly what will be the effect of the proposed amendments on the Acts of 1897 and 1900. The 1897 Act is, of course, the one embodying the principle of compensation; the object of that of 1900 being merely to bring agricultural labourers within its scope.

In view of the decision of the Departmental Committee, that no sufficient reasons had been adduced for its alteration, the Bill does not interfere with the present freedom of employers from liability for accidents involving disablement for a period of less than two weeks, nor with the stipulation that in any case compensation only becomes payable as from the commencement of the third week. There was a great fight over this point before the Committee. The men's representatives made vigorous efforts to obtain an expression of opinion that the two weeks' limit should be either abolished or considerably reduced; while on behalf of the employers it was contended that (apart from the question of the additional cost of including the whole or any portion of the first fortnight) experience showed that to compensate for accidents the effects of which lasted for a very short period would lead to an enormous increase of claims for compensation for trivial mishaps. The retention of this margin, as regards compulsory schemes, does much to safeguard masters from an abuse of the principle of compensation by malingering, &c. Where provision for the first two weeks is considered really desirable for the men, it can be secured by means of a mutual scheme to which both employers and employed contribute. As already stated in the "JOURNAL," such a plan is in vogue at the works of the South Metropolitan Gas Company. Under an arrangement like this, abuse is much less likely to occur, for the fact of the men themselves providing some part of the funds furnishes them with an interest (which is otherwise wanting) in seeing that no unfair claims are made. Contracting out of the Act by means of these mutual schemes will still be possible, for the Bill does not propose any modification of the powers now in force in this respect.

At present a workman cannot proceed against his employer under the Workmen's Compensation Act and also at the same time under the Employers' Liability Act or at Common Law. If, however, he proceeds under the Employers' Liability Act or at Common Law, and fails, the Court may, if thought fit, assess compensation under the Compensation Act, subject to power to the Judge (which, however, is rarely exercised) to order the deduction of the costs of the unsuccessful proceedings. This the Committee regarded as unsatisfactory, and as being responsible for a large quantity of illegitimate litigation. In their opinion employers had just cause of complaint with regard to the wrongful use of proceedings, or threats of proceedings, at Common Law or under the Employers' Liability Act in order to force settlements. To meet these objections, the Bill provides that where a workman has commenced proceedings against his employer under the Employers' Liability Act, and the employer admits liability under the Compensation Act, the Court shall (if it is determined that the employer is not liable to pay damages under the Employers' Liability Act) forthwith make an award under the Compensation Act, and in such case "shall" order that all the costs which may have been caused by proceedings having originally been brought under the Employers' Liability Act, instead of under the Compensation Act, shall be deducted from the amount of compensation.

The existing Act stipulates that proceedings for the recovery of compensation shall not be maintainable "unless notice of the accident has been given as soon as practicable after the happening thereof, and before the workman has voluntarily left the employment in which he was injured, and unless the claim for compensation with respect to such accident has been made within six months of the occurrence of the accident causing the injury, or, in case of death, within six months from the time of death."

The Bill states that proceedings shall not, "without the leave of a County Court," be maintainable unless notice in writing of the accident has been given within six days, a claim for compensation has been similarly made within three months (or, in case of death, six months from the time of death), and proceedings to enforce the claim have been commenced within three months of lodging the claim. One of the witnesses before the Committee stated that the words "as soon as practicable" had given rise to a great deal of litigation in Scotland, and it was thought therefore that a fixed time (subject to the provision that after the expiration of the limit, notice might be served with leave of the Court) would be preferable. The fixing of a period after the notice of claim within which to commence proceedings, is also a step in the right direction; for as the law now stands proceedings may be kept for an indefinite time hanging over an employer's head.

Among the additional classes of workers who will be entitled to benefit under the new Bill may be mentioned those employed in tramways, workshops, laundries, docks, wharves, quays, warehouses, and smithies. A sub-section is also added making an employer liable for accidents occurring away from his works, if it is proved that the absence of the workman from such premises, work, or building was due to the nature of his employment at the time of the accident. Men loading or unloading or repairing ships in harbours or canals are included, as well as those engaged on any vehicle or vessel used for the purposes of the business of a carrier of goods or passengers by land or inland navigation, and in the care or management of horses or locomotives. Among the definitions of the various premises and employments referred to in the Bill, it is stated that a "factory has the same meaning as in the Factory and Workshop Act, 1901." A workshop means a workshop, other than a domestic workshop, within the meaning of the Factory and Workshop Act, 1901, unless it is proved that the number of persons regularly employed therein is less than five. In the 1897 Act, "engineering work" was stated to mean "any work of construction or alteration or repair of a railroad, harbour, dock, canal, or sewer," and to include "any other work for the construction, alteration, or repair of which machinery driven by steam, water, or other mechanical power is used." It is now defined as including "any railroad, harbour, dock, pond, inland navigation, road, embankment, sewer, gas or water works, well, telegraphic line, or electric line or work, or part thereof, which is being made, laid, altered, repaired, demolished, or removed." Men engaged in erecting a building did not come within the old Act unless the structure was 30 feet in height; and this gave rise to several remarkable actions, and considerable dissatisfaction. Now, however, the limit is to be removed, and the provisions extended so as to cover men engaged in constructing, altering, repairing, decorating, or demolishing any building.

The Bill also makes extensive alterations in the two schedules of the 1897 Act. These schedules refer to the scale and conditions of compensation and the method of arbitration; and we may next week have an opportunity of pointing out some of the more important changes in these respects that are proposed.

TRADE UNIONS AND TRADE DISPUTES BILL.

ATTENTION has already been called (*ante* p. 692) to the re-introduction by Mr. Whittaker of the Bill dealing with the above subjects, which was read a second time in the House of Commons last year by a majority of 29, but proceeded no farther. This year the majority in its favour has increased to 122; commenting upon which circumstance "The Times" says it suggests that the mercury of the political barometer is falling towards the point at which a dissolution of Parliament is no longer regarded as a remote contingency. However this may be, the fact of so large a majority approving of the second reading possesses a significance that should be a warning to all who are concerned in the maintenance of equal rights and privileges. For the Bill aims at nothing less than the establishment of a privileged class, by providing that certain combinations of individuals shall be above the law. It legalizes "peaceful picketing," amends the law of conspiracy in favour of Trade Unions and other associations of individuals, and provides that Trade Union or Association funds shall not be liable by reason of the action of a member or members of such Trade Union or other Association. It is evident that the progress of the Bill would have been less satisfactory to its promoters had the Government not decided to be neutral with regard to it; such neutrality being the more extraordinary seeing that the Royal Commission on Trade Disputes, which was appointed in 1903, has not yet reported, though it is understood to have completed the taking of evidence. The Trade Unions declined to give evidence before this Commission, on the ground that they were not represented on it. The Bill has been referred to the Grand Committee on Law, and is expected to be again before the House before the report of the Royal Commission on Trade Disputes has been received, in which case the hopes of all who desire individual liberty may have to be centred in the House of Lords.

Why should any class of the community be placed above the general laws which govern that community? Why should it be made lawful for any number of persons to "attend" near any house or place where any person resides or works or carries on his business, or happens to be, for the purpose either of peacefully obtaining or imparting information, or of peacefully persuading any person to work or to abstain from working? Everybody with any experience of these matters knows very well what such peaceful persuasion amounts to. It is neither more nor less than intimidation in one of its worst forms that it is sought to legalize—intimidation to be carried on in furtherance of the views and purposes of organizations that have over and over again proved themselves to be intolerant of individual opinion. That some good work has been done by the Trade Unions may be freely admitted; but it is not this which the law as it stands restrains or hinders them from doing. The law is a terror to the evil doers, and not to those who do well. Moreover, it is admitted that, since the decision in the Taff Vale case, trade disputes have been much more easy to settle than formerly, and less bitterness of feeling has been shown. It would indeed be unfortunate if by any alteration of the law, a weapon were to be placed in the hands of either the workmen or the masters by which the individual could be deprived of the freedom, which is his right, to dispose of his own labour or his own capital according to his will. This is secured to him at the present time by common law; but the Bill proposes, in effect, to take this from him, and substitute for it the will—not to say the tyranny—of a majority.

The second clause is not less favourable to the aims and objects of Trades Unions, for it provides that an agreement of two or more persons to do any act in furtherance of a trade dispute shall not afford ground for an action if the act in question might legally be done by a single person. The third clause would emancipate Trade Union funds from liability for damage sustained by reason of the action of any of its members, and would consequently release them from a liability which falls naturally upon all citizens, and is the natural protection of persons and property. As, however, was pointed out by the Attorney-General in the course of the debate on the second reading of the Bill, this freedom from liability is not required for any good or useful purpose, because Trade Unions are only liable at present for acts which they can be shown to have authorized. The separation of sick and benefit funds can easily be effected. What is required is that what may be called their fighting funds should be kept distinct; and it is to be hoped that the day is far distant when it will be rendered possible for them to escape liability for any wrongful acts which they may either authorize or actually commit.

Messrs. Graham, Morton, and Co.'s Action in Regard to the Milan Gas-Works Contract.

Last Friday afternoon, application was made to Mr. Justice Lawrance, in the King's Bench Division of the High Court of Justice, to fix a day for the trial of the above-named action with a Special Jury. Mr. J. A. Simon, who made the application on behalf of Messrs. Graham, Morton, and Co., said the action was set down in August last, but had been postponed from time to time, and was now ready for trial. On one side experts would be called from Italy, and on the other from all parts of England; so that it was very desirable that a day should be specially fixed for the trial. He suggested that the case should be put down for the 10th of April. Mr. Spokes, who represented the defendants, thought this date most inconvenient, as the trial would occupy about three weeks, and the Easter Vacation commenced the 19th of April. On his side, eight witnesses would have to be brought from Milan. The question at issue was a most complicated and difficult one; and he thought it would be a miscarriage of justice to let the Jury go away for a fortnight, in which time they would forget many of the technical details. Mr. Simon said the Solicitors instructing his learned friend had already consented to the 10th of April as being a convenient day for the trial. His Lordship said the case would be in the list on the day named, subject to anything part heard.

Classification of Industrial Gases in Paris.

The current number of the "Journal des Usines à Gaz" contains the conclusion of a long report presented to the Prefect of the Seine by M. Jungfleisch on the subject of a project which is under the consideration of the Hygienic Council of the Department of the Seine for classifying works in which are produced gases that are not employed for illumination. The gases in question are the following: (1) Water gas; (2) producer gas; (3) carbonic acid gas; (4) generator water gas; (5) wood gas; (6) blast-furnace gas; (7) hydrogen gas; (8) carburetted air; and (9) sulphuretted hydrogen. The reporter fully describes each gas, and says it is unnecessary to register Nos. 1 to 5 and No. 8, when these gaseous combustibles are not employed in dwellings; but that they should be entered in the second class when intended for public use, and in the third class when for private use. He also advises that the production of sulphuretted hydrogen on a large scale, as well as its employment, either by complete or incomplete combustion, should be entered in the first class; and that the nomenclature of the establishments classified should be revised in regard to the gasholders and other reservoirs—account being taken of the nature of the gases they contain, and of the pressure at which they are stored.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 864.)

BUSINESS on the Stock Exchange last week was not in its best form; and the general tone was cold and dull—a feature which did not improve as the week progressed. The new big issues attracted much attention, to the detriment of the existing lines; and they were readily taken up—one of them, the Siamese loan, being subscribed forty times over. Consols felt the influence and shrank, and some other gilt-edged securities sympathized. In the Money Market, there was a fairly good demand—not an unusual feature about the end of the quarter; and discount rates were firm. In the Gas Market, the slackening down in the volume of business which we noted last week was continued. Even the big issues were quieter; while many prominent undertakings were neglected altogether. Changes in quotation, too, are fewer in number, and mostly very moderate in degree. But still they are nearly all in the upward direction; and those which are not have special circumstances to account for their exceptional movement. In Gaslight and Coke, the ordinary was quieter on the whole, although on one or two days it quickened up; and prices were inclined to be easier. The range of transactions was from 99¾ on the opening day to 98¾ at the close. Moderate business was done in the secured issues; the maximum changing hands at 92¼ to 93½, the preference at 113 and 114, and the debenture at 90⅞. South Metropolitan was done daily to a small extent, and at pretty level prices; the best being 130¼, the lowest 129. The debenture was marked twice at 90½. Commercials were very quiet; one deal in the 4 per cent. at 116 being all the business. The Suburban and Provincial group were unusually inactive even for them; and in the London Market there was not a single move in quotation. Brentford old was done at 249; and a special bargain in British was marked at 41½. South Suburban changed hands at 121; West Ham at 103½, and ditto preference at 124½ and 124¾. In the Provinces, there was more movement. Liverpool "B" had a smart rise of 2½, Newcastle had a smaller advance, and in Sheffields all three issues came out from one to two points higher *ex div.* The Continental Companies were only moderately dealt in. Imperial advanced a point, with business at figures ranging from 218½ to 220. Union had a further fall of two points; business in the ordinary being marked at 113 and 115, and in the preference at 144. Tuscan was done at 10. Among the undertakings in the remoter world, Bombay was done at 6⅝. Cape Town advanced, and was marked at 16⅞ and 17, and ditto debenture at 53½ and 53⅜. Hong Kong had a transaction at 16¾. Buenos Ayres realized 12½, and Monte Video 11⅜ and 11½. Primitiva fell sharply when the dividend announcement came out at only 6 per cent., but recovered partially later on. The ordinary changed hands at figures ranging from 5 1/16 to 6⅜, ditto preference at from 5 to 5 3/16, and ditto debenture at 96¼ and 96½. River Plate was done once at 13¼.

The closing prices are shown in our Stock and Share List on page 864.

ELECTRIC LIGHTING MEMORANDA.

The London Power Bills—Credulity and Incredulity—Costs Extraordinary—The Cost of Generating Fires at Manchester—Raising Voltage and Fears in Marylebone.

DUTIFULLY, the five noble Lords sat in the Grand Committee Room of Westminster Hall for four days last week (taking a long rest from Thursday until yesterday), listening to the further development of the information regarding the large electrical power scheme of the Administrative County of London Company, over which certain of the London papers have gone almost into hysterics. Every human requirement, according to the credulous writers of these prints, is now to be met by electrical means when the promised good time comes. We shall, in short, be electrified so completely, and the comfort so assured and work so eased, that the present time will then present itself to memory as almost a hideous dream. But if the readers could all turn from these fables of volatile writers to the business going on before the Earl of Camperdown, other impressions would displace those that may have been made by the sensational scribes. The promoters seem to be endeavouring to largely pilot their scheme by playing on popular imagination. They are, however, finding it far more difficult to impress the stability of their proposals upon the Lords Committee, with such a compact body of the legal element as they have against them, backed by electrical experience of equal weight to anything that can be brought up in support of the scheme. Incredulity has been early aroused by the promoters' capital and works costs, which have been put forward by the Engineer, Mr. C. H. Merz, who, though a clever young man with an exceedingly good record of work in connection with the Tyneside electric power undertaking, will be extremely clever if he succeeds in prevailing on Parliament to deliver London into his hands on mere hypothesis. Already the Committee have asked the Company to prepare for them a return showing what has been done in the matter of power supply in districts in which other companies were previously supplying the electricity, with statistics as to areas, capacity, and the like. The return, we fear, will not assist the promoters much; for the available figures cannot yet prove anything that can give satisfaction to the Committee as to the public advantage of according the desires of the promoters. The Committee's requirement is a practical one; and it will give them something very interesting to consider in conjunction with the hypothetical statistics they have already been asked to digest.

Mr. Merz places his capital costs for generating stations at less than £9 per kilowatt, as against £51 per kilowatt for existing stations. But as soon as opposing Counsel began pulverizing exercises upon the estimates, it was found that the calculations had not altogether uniform bases. The economical ability of large stations is in the case for the Bill strained to the utmost decimal points. It is the unprecedented size of the boilers and generating plant, and finding them cheap iron structures for habitation, that is going to do the trick. The high load-factor will be the important thing, of course, in shaving down the works costs. There appears to have been some confusion brought about by figures being introduced as to costs based on the units generated instead of sold. The great difference between production and sale, which means loss somewhere between generating-station and quantity paid for, is rather an alarming matter in the case of numerous electricity undertakings. Therefore it makes the figures look considerably more wonderful and attractive calculated out on the generated units than the units measured at the consumers' meters. However, the expected result is that the total cost of production will be 0·507d. per unit, and the average selling price 0·7d.; so that there will be, or it is hoped there will be, a margin of 0·193d. The promoters have already passed a host of their supporters through the witness-box; and their financial statements have been subject to terrific criticism. The existing supply authorities and companies consider that they are quite as well able as the gentlemen from the North to comply with all London's necessities in respect of electricity. The promoters in one breath attack the existing suppliers, affirming that 96 per cent. of the ground available for the supply of electrical power in London is uncovered; and that this is due to the bad business methods of the present suppliers—particularly from the point of view that they have no less than 60 to 100 stations scattered through London. All the electrical genius centred in London has been at fault; Mr. Merz is London's saviour. In the next breath, the promoters try to carry everybody away with their unbounded benevolence, even to the existing suppliers. They are going to give the public electricity for next to nothing; and their greatest mission is to be the friends of the local authorities and companies, and to make them more prosperous. It is computed that the sale by the Company will be up to 130 million units by 1910; and that this will include 82 millions to be taken by the existing authorized distributors—if they will take it. There is much chance and supposition about it all; and these are the staple elements in the foundation of the scheme. The promoters have an uphill task to prove their vague and unsubstantial arguments; and they have not yet gained much in the way of confidence from qualified outsiders. The opposition includes the London County Council and the Borough Councils of London; and at a conference of the local authorities convened by the former for yesterday week, a resolution was passed agreeing that it was in the interests of the whole Metropolis that the Bills now before Parliament should be strenuously opposed.

Is the electrical industry to be judged as a whole in respect of such trifles as destroying people's property by fire by the plea set up by the Manchester Corporation in a case brought against them, and heard last week—that the matters complained of were incidental to, or inevitably resulted from, the due discharge of their public duty under the Electric Lighting Acts, for the result of which they were not responsible; and that short circuiting in their mains was not due to their negligence or the negligence of anyone in their employ? The action was brought by Messrs. Midwood and Co. to recover £677 4s. 6d. (the agreed amount of damage if nuisance and negligence were established), being loss sustained by them in 1903 by a destructive fire caused by the fusion of one or more electric cables or service-lines belonging to the Corporation. It is interesting to observe in passing that the Insurance Companies were said to be fighting the case. According to Sir Edward Clarke, the mains which produced the fire and explosion were laid, in 1898, in bitumen and wooden troughing, covered by concrete. The action of the electricity on the bitumen produced an explosive gas; and the result was a particularly violent explosion and fire. At one time it would have been said that coal gas was the cause of this. Witnesses told the Court of explosions that had happened on their premises, and of the Corporation hushing up the matter by paying the resulting damage. Reports were put in of eleven accidents arising from faults in the defendants' circuits between January, 1902, and October, 1904. Expert electrical engineers stood up in Court and averred that the Manchester system which caused these things was a proper one, according with modern knowledge and the Board of Trade regulations. So that if we accept their sworn testimony, modern knowledge and the Board of Trade regulations are unequal to the task of preventing explosions and destructive fires on certain electricity distributing systems. The incidents referred to are, according to Mr. Fletcher Moulton, K.C., "quite ordinary" in electrical systems. But after all this hard swearing to prove that there was no negligence, and that Manchester could not have a more peaceably disposed electricity distributing system, the jury were in favour of plaintiffs, who thus secured judgment

for the agreed amount of damages, with costs. Whether there is to be an appeal has yet to be decided; but the effect of the verdict is that the electricity system in Manchester has been branded a nuisance. The seriousness of this to all concerned in electricity supply cannot be over-rated.

A protesting cry has gone up from the ratepaying electricity consumers of Marylebone. The illusory pledges of the Borough Council that induced the ratepayers to support the Bill which eventually landed on them an undertaking at a cost that struck the municipalizers temporarily dumb with astonishment were almost forgiven, when the Council came down upon the consumers with proposals to increase the pressure at which electricity is supplied from 100 (the 100 having been increased from 50) to 240 volts, and to supply the electricity on the maximum demand system. It is believed that both these proposals are against the interests of the ordinary consumers. An assurance has been obtained from competent advisers that the maximum demand system will increase the cost of electricity to the ordinary householders by at least 25 per cent. The proposal to increase the pressure to 240 volts is much more serious; and there is no doubt in the minds of those who feel themselves aggrieved that—apart altogether from the increased cost of the lamps, and the expense of more frequent renewals—the change will be a source of real danger. Many of the houses were wired ten or twenty years ago; and the change in such cases, to assure anything like a feeling of security, really necessitates a new installation. Insurance has been recommended. That is thoughtful. But what about the endangering of life and the inconvenience occasioned by the mysteriously sudden conflagrations of electricity supply? Under the circumstances, the ratepayers of the borough have been ventilating their grievance in the public Press. The happenings of late have assisted in undermining confidence in that much once-glorified recommendation of electricity, that it was a sure preventive of disaster by fire.

MONAZITE SAND AND THORIUM.

Information from a New Source.

One of the subjects in which the gas industry has the strongest possible interest, and mixed up with, and dependable upon, which to such large degree is prosperity, is that of monazite sand and its product thorium. But, notwithstanding, it is a subject on which it has been difficult in the extreme to obtain reliable knowledge. The reason of this is obvious. Monazite sand and the production of thorium on a scale sufficient to satisfy the requirements of the gas industry are in the hands of the few. Really, the German Syndicate who govern things so neatly to their own great profit, have spread their net so completely, that from the sands to the thorium there is only one source of supply that is outside their domination, but there is a possibility of this being supplemented on a small scale in the near future. But the latter appears to be much more in the nature of a private investment from a British quarter for self-protection than a business venture. It is because of this confined control that information is so well guarded and concealed.

News sometimes comes at unexpected moments. During the last few days we have obtained some notes on this subject which we think will be of great interest to readers, and their publication may have a beneficial effect. In this country, we have been in the habit of looking to Brazil as being our only source of supply. Carolina we have known is another source; but it has been regarded as being closed to all but American requirements. It has been so as a matter of fact; but it may not always be the case. And the sooner competition can be effected, the better. The deposits of the monazite sand are in southern North Carolina and in north-western South Carolina; being distributed over an area of probably 2000 square miles. The deposits occur principally in streams, and are, in places, locally enriched. They are, of course, intermittently deposited; and between one deposit and the next that is worth recovering, several miles may intervene. There are occurrences of monazite in the rock formation; and, of course, this formation is the primary source of the alluvial deposits. The rock containing monazite has been worked in one place—Shelby, in North Carolina; and since the beginning of this year, one rock property has been sold to an English interest for $45,000 (£9000) in cash. The Carolina monazite sands, it is stated, are rather richer than the Brazilian sands, and yield from 4 to 6 and even 7 per cent. of thorium oxide; but it may be taken that the monazite from the rock deposits carries an average of 6 per cent. of thorium oxide. As a point of interest, it may be explained here that the yield in nitrate is always double the yield in oxide; so that, when one speaks of a 6 per cent. monazite sand, it may, generally speaking, be reckoned that it will give a 12 per cent. yield of nitrate, or, putting it another way, ⅓ kilo. of oxide represents 1 kilo of nitrate, and 1 kilo. of nitrate is equal to the production of 800 mantles.

The known alluvial deposits of monazite in Carolina are held by the Welsbach Company of America, and by the National Light and Thorium Company, of Youngstown (O.). Both concerns have factories for the extraction of the nitrate; and both are successfully operating at the present time—in fact all the thorium consumed by the Welsbach interest in the United States since the year 1894 has been extracted from the Carolina monazite sands. The American Welsbach Company turn out from 20 to 22 million mantles a year; but, of course, there are several other makers of mantles in America as we shall presently show. And, therefore, in addition to the American Welsbach Company, there are others who are indebted to Carolina for their supplies of thorium to the extent of 75 kilos a day, or, taking the year through, about 20,000 kilos. It is estimated that the American Welsbach Company made a little over one-third of the mantles consumed in the United States; the total requirement being somewhere between 50 and 55 millions per annum. But, notwithstanding that the production of Carolina thorium is a protected industry, there is competition in thorium in the United States from the German Syndicate. In 1903, the Syndicate's thorium imports to the United States were about 65,000 lbs.; in 1904, they had increased probably to 80,000 lbs., in spite of competition by the American Companies, which competition has become very acute with the advent of 1905. The price at which it is sold is about 25s. per lb., which is equivalent to 55s. net per kilo. There is a duty of 25 per cent. on the imported material, and that is the reason the price is rather higher there than here. On imported monazite sands, there is a duty of $120 a ton. Out of Carolina sand, about 60,000 kilos. of thorium a year are being made; and it is calculated that the known Carolina sources whence thorium can be recovered at present prices is equal to the next twenty years at the present rate of production. Of course, this does not mean that there is not more to be obtained, but, owing to the low percentage of thorium in the sands which may subsequently have to be worked, not at the existing prices. It has been computed by one authority that the Brazilian sands workable at present rates are equal to the next ten years. But, in these periods, the sources of monazite sands may be—also they may not be—multiplied from which thorium can be recovered at prices as cheap as, or even cheaper than, those existing. Eyes are keenly searching the world. But there is no doubt about this, that the consumption is increasing faster than the sources of supply of the raw material. Under present circumstances, the prospect of a reduction in the price of thorium is very small; and whatever reductions are made will be only temporary.

It is considered by some that the existing prices of thorium are not more than they ought to be. Just consider this that Brazilian sands are shipped to Germany, the thorium extracted, the thorium is shipped to America, a duty of 25 per cent. is paid on it, and there it enters into competition with Carolina thorium at little above the prices quoted in this and European countries. Is the price here more than it ought to be? It is not overlooked that a considerable part of the rise in thorium nitrate is due to the exactions of the Brazilian Government in levying an *ad valorem* duty of 50 per cent., and that this probably accounts for about 10s. per kilogramme. But there are wheels within wheels in this thorium business. The actual Syndicate arrangement is this: Gordon and De Freitas controlling the Brazilian monazite sand situation sell only to a favoured few—Messrs. Sthamer, De Haen, Kuhnheim, and Knoeffler, and the Austrian Welsbach Company. This, we are informed, is the composition of the German Syndicate. No others can buy monazite sand, or if they can the price is put so high that there is no profit in it. Then it is stated that the American Welsbach Company have an "understanding" with the German Syndicate. So that, in effect (perhaps we ought to say actually)—considering the American Welsbach Company as being part of the combination—there are only two interests holding monazite sands; and the National Light and Thorium Company previously mentioned is believed to be the one totally independent of the Syndicate. So far as is known, the Carolina fields are entirely controlled by the American Welsbach Company and the National Light and Thorium Company; and the fields are about equally divided between them—except the small property which is now in the possession of the English interest referred to previously. But we were speaking of the German Syndicate; and another supposition is that Gordon and De Freitas are also, in addition to the sale of the monazite sands, interested in the profits of the German thorium business.

Attention is also called to the spread of the controlling power of the German Syndicate. Within the last month, it is stated, the German Welsbach Company have purchased the business of Messrs. Richard Feuer and Co., their principal competitor, for 1,800,000 marks. That firm manufactured about 12 million mantles a year; and so this makes the Company a very powerful Syndicate organization. There are a number of independent manufacturers in Germany, whose supplies have been mostly obtained from old mantle ashes. Although, until recently, 50 to 100 tons of North Carolina sand filtered through in that direction, this supply has been stopped. It is an interesting piece of information in this connection that on the Continent the price of mantle ashes has been advanced to 56 and 58 marks per kilogramme; and at this price there is no profit to the independent makers, although they can get about 1·6 of the weight in nitrate. The mantle ash is an oxide; and it is the nitric acid that adds to its weight. There are 26 of these independent manufacturers in Germany; and they are combined in an Association, and the Association it appears have to obtain their supply of thorium from one source. That one source is the German Syndicate. The Welsbach Company of America, being in the position already explained, is also naturally in a better position than those competing manufacturers who are compelled to pay the Syndicate

prices. This being so, the American Welsbach Company are increasing the volume of their business at the expense of independent competition. The principal independent makers of America are: In Chicago, Messrs. Lindsay and Co., the Liberty Incandescent Light Company, and the Peerless Incandescent Light Company. In New York, the Cremo Incandescent Light Company, the Raritan Incandescent Light Company, the Adams Incandescent Light Company, and the American Incandescent Light Company. In Pittsburg, the Duquesne Incandescent Light Company. Scattered round, there are probably some six or eight concerns of a small character.

PERSONAL.

Mr. W. J. CARPENTER has been appointed General Manager of the Great Yarmouth Gas Company, in addition to his position as Engineer.

Mr. C. E. BRACKENBURY, Assoc.M.Inst.C.E., has been elected a member of the London Lincolnshire Society, having been proposed for membership by this year's President, General the Right Hon. Sir Henry Brackenbury, G.C.B., K.C.S.I.

OBITUARY.

The death is announced as having taken place on the 20th of February, at Mentone, of Herr THEODOR WEIGEL, the founder, and for many years manager, of the Thuringian Gas Company at Leipzig.

We regret to announce that Mr. GEORGE TOOLEY, the Manager of the Meadow Lane Gas-Works of the Leeds Corporation, died last Saturday, after a short illness. He had held the position for twenty years; and before obtaining it he was Manager of the Bankside station of the Phœnix Gas Company, which was taken over by the South Metropolitan Company. Mr. Tooley joined the Gas Institute in 1888, and was a member of the Institution of Gas Engineers.

By the sudden death, early on Wednesday morning last, of Mr. JOHN MORRIS, of the well-known firm of Ashurst, Morris, Crisp, and Co., a familiar City figure has been removed, and the Boards of a number of Companies have been deprived of the assistance of a man of refined experience in the organization and control of joint-stock undertakings. Among other concerns of which he was a Director may be mentioned the Beyrouth Water-Works Company, the Consolidated Water-Works Company of Rosario, and the Monte Video Water-Works Company. At the meeting of the last-named Company on Wednesday, feeling reference was made by the Managing-Director and Secretary (Mr. J. Anderson) to the suddenness of the sad event of only a few hours previously; Mr. Morris having been in the office the preceding day. The deceased gentleman was in his 82nd year.

By the death, on Monday last week, of Mr. DAVID DULLEY, Wellingborough has lost one of its most public spirited men, who will be mourned by rich and poor alike. He was one of the founders of the Wellingborough Gas Company; and at the time of his death was Chairman. He was also Chairman of the Brewery Company formed out of the private concern with which his family had been associated for many years, and was likewise connected with several local undertakings, commercial and philanthropic. He was a member of the old Local Board of Health, was chosen as Chairman, and filled this office when the Board became the Urban District Council. He was elected a member of the County Council in 1889, and again in 1892 and 1895, but retired twelve months ago. He was appointed a Magistrate in 1894, and elected an Alderman in 1898. The deceased gentleman, who was 72 years of age, leaves three sons and four daughters. The funeral took place last Friday.

The Earl's Court Exhibition Medal.

Our readers will doubtless remember that in the first number of the "JOURNAL" for the present year we gave the design of the medal that the Advisory Committee of the International Gas Exhibition at Earl's Court had decided to have struck for distribution among the exhibiting firms—not in the way of an award or a diploma, but simply as a *souvenir* of what they rightly considered to have been "one of the greatest instances of success in hearty co-operation that had ever been known in this or any other country." The medals are now being sent out by direction of the Council of the Institution of Gas Engineers; and we are pleased to acknowledge the receipt of one from Mr. Walter T. Dunn, the Secretary. The closing weeks of the year 1904 will always stand out conspicuously in the history of the gas industry as a period which witnessed a laudable effort on the part of those engaged in it to make the public more familiar with the nature and extent of its operations, and show them how closely their own personal interests were associated with its progress and development. The result of that effort has been to place the industry on a firmer foundation than it had ever stood upon; and the achievement is one at which all who participated in it may justly feel gratified.

SCOTTISH JUNIOR GAS ASSOCIATION.

Western District.

The last Meeting for the present session of the Scottish Junior Gas Association—Western District—was held in the Technical College, Bath Street, Glasgow, on Saturday evening. Mr. JAMES LOWE, the President, occupied the chair, and, without remark, introduced the business of the evening.

PRODUCER GAS AND PRODUCERS.

Mr. A. H. WHITELAW (Glasgow) read a paper on this subject. He began by describing the composition of producer gas, and then proceeded to refer to the Duff producer, which he said was as near perfection as could be; the air being delivered vertically in the very centre of the fuel, and at the same time uniformly distributed throughout its entire mass. This advantage, he said, was due to the grate, which is a sloping grid placed right across the centre at the bottom of the producer, causing the steam and air to be diffused in all directions, permeating the entire surface of the fuel while ascending to the gas-flue. A feature of the Duff grate is the large blowing area; and in view of the considerable volume admitted, and its uniform distribution, Mr. Whitelaw said it was only to be expected that the combustion of the fuel would be almost complete. The clean burnt ashes forming the refuse bore excellent testimony to the efficiency of the apparatus. He then proceeded to describe the producers at Provan Gas-Works.

The producers at Provan are of the Duff grate type, twelve being required for each retort-house; and each producer is capable of heating 60 retorts. The producer casing is constructed of 5-16th inch steel plates, and measures 9 ft. 4 in. by 6 ft. 4 in. and 13 ft. 3 in. high, and is lined with fire-brick 11 inches thick. The top plate is provided with two cast-iron charging mouthpieces fitted with cones, levers being attached for lowering these when the charge of hot coke is to be introduced; also with eight cast-iron clinkering plugs for cleaning-out purposes. Lattice girders rest on the top of the producers for carrying the narrow-gauge railway along which the hot coke is conveyed on bogies. The ash-pit stands 20 inches high from the bottom of the producer, and when filled with water gives a 6-inch water-seal. The V-shaped grate, which extends the entire length inside the producer, is found to be most serviceable, as the clinker passes freely between it and the fire-brick lining into the water, and is raked out from the ash-pit when necessary. Clinkering takes places once every eight hours, without interfering with the production of gas.

On leaving the producer, the gas ascends a vertical flue and thence passes through a damper into the main flue overhead. While travelling along this flue, it is made to pass through a dust chamber, where all particles of carbon dust are removed. It now passes along the delivery flues to the distributing flues running parallel to the retort-bench, and is then admitted through dampers into the regenerative settings and ovens. The flues are all lined with 4½ inches of fire-brick, and a layer of slag wool 2 inches thick is rammed tight between the plate and the brick lining to prevent loss of heat by radiation. There are four dust chambers, each 11 ft. 3½ in. by 6 ft. 10 in. by 22 ft., lined with 9 inches of fire-brick and 2 inches of slag wool; and two relief valves are bolted to the top of each chamber. The main flue is 4 ft. 10 in. in diameter; the distributing flues being 3 ft. 7 in. wide and 5 ft. 8 in. high. The production of the gas is regulated automatically by the pressure of the gas in the flue from the producers, which acts upon a blast governor, causing it to operate upon a valve in the steam-pipe leading to the steam-jet blowers. This ensures that the force of the blast entering the producers is proportional to the pressure of the gas in the main flue. If the demand for producer gas increases, the air and steam supplied to the producer increase; and thus we have the demand regulating the supply. The pressure of the gas as it leaves the producer varies from 2-10ths to 3-10ths; the maximum at Provan being the latter.

Perhaps the most interesting application of producer gas is its use in gas-works for heating the retorts. The late Mr. Foulis was the pioneer in Great Britain in introducing regenerative gas firing for retort-settings. In conjunction with the late Sir William Siemens, he introduced to the Dalmarnock Gas-Works, Glasgow, in 1882, the Siemens-Foulis system of regenerative gas firing—one of his many successful patents which have reduced the price of gas to the consumers in the city. In this installation, each setting was provided with its own independent producer, which consisted of a cylindrical shell lined with fire-bricks, and having a charging-door at the top for receiving the hot coke when drawn from the retorts. It has an opening at the top, forming an outlet for the gas, which on entering the regenerative setting at once comes in contact with the secondary air necessary for its complete combustion. In 1897, Mr. Foulis introduced to the Dawsholm works an outside producer gas plant, and by a series of flues conveyed the gas to each setting—thus doing away with an independent producer for each setting, and thereby reducing to a minimum the cost of the plant, and at the same time saving about 10 per cent. in fuel and 100 per cent. in working expenses. Larger plant of the same kind, consisting of six producers for heating 360 retorts, was introduced in 1902, and is giving excellent results.

Returning to Provan, in No. 1 retort-house there are 12 retorts

to each oven; and with 60 ovens there is a total of 720 retorts each 9 feet long. The oven wherein these are built is of the style which is common to all gas-works. Underneath it is the regenerative setting, which consists of a number of vertical passages, two for producer gas and two for secondary air, one of each; on either side of the centre retort (or middle of the oven). Between each of these the passages for the waste gases are placed; all the passages being divided into horizontal compartments by a series of tiles from the front to the back of the setting. The gases and secondary air enter at the front of the bottom compartment, and travel to the back of it, where there is an opening in the compartment above; and so the gases and air travel backwards and forwards in their respective passages until they arrive at the meeting point just under the retorts, where combustion takes place. While the producer gas and secondary air are travelling to and fro and upwards in their own passages, they come in contact with the sides of the waste-gas flues, and absorb part of the heat which would otherwise pass to the chimney and be lost. The supply of secondary air should be sufficient to ensure the complete combustion of the producer gas under the retorts; for if good heats are to be maintained, it is essential that none of the carbonic oxide should pass to the chimney, but should all be consumed to carbonic acid.

From a series of observations made over a period of nine shifts of eight hours each, with nine producers heating 528 retorts, I find, on an average, that each outside producer consumes 8 cwt. of coke per hour, and the residue in the ash-pit is 16 per cent. of the coke consumed. The blowing area of the Duff grate for each producer is 450 square inches, and the amount of air and steam passing through the grate per hour would be roughly: Primary air, 40,000 cubic feet; steam, 8000 cubic feet. This would give a yield of about 64,000 cubic feet of producer gas every hour at a particular temperature. The average percentage composition of the gas formed is: CO, 31; H, 9; CH_4, 1; CO_2, 2; N, 57—the combustible gases being 41 per cent. The specific gravity of the gas is 0·84, and it has a calorific value of 135 B.T.U. per cubic foot. The feature of the composition is the high percentage of carbonic oxide, and the low percentage of carbonic acid. In a perfect producer, where the consumption of steam is 50 per cent. of the carbon by weight, I find by calculation that the percentage composition of the gas evolved is: CO, 37·87; H, 12·5; N, 49·63—the combustible gases being 50·37 per cent. The calorific value of the gas is 159 B.T.U. per cubic foot. The outside producer I have already referred to has a similar consumption, the steam being 50 per cent. of the coke by weight; and its gas has a calorific value of 135 B.T.U. per cubic foot. Hence the ratio of the combustible gases 41 : 50·37 would give an efficiency of 81·4 per cent. for the Duff producer.

The temperature of the gas as it leaves the producer is 1000° Fahr., and it falls to 800° Fahr. in the distributing flue before passing into the regenerator. After being regenerated to about 1600° Fahr., the gas enters the oven, where it meets the secondary air necessary for combustion. The temperature in the oven ranges from 2000° to 2200° Fahr., while that in the chimney may vary from 600° to 900° Fahr. The average composition by volume of the chimney gases is: CO_2, 17·5; H_2O, 4·5; O, 1; N, 77. The presence of oxygen in the chimney indicates that excess secondary air is being admitted to the ovens; and when this excess is kept within reasonable limits, it is a distinct advantage, as it secures complete combustion of the carbonic oxide under the retorts. The use of too much secondary air may be a mistake, as we have loss of temperature in the oven by heating up the excess air. But it is a greater mistake to use too little; for part of the carbonic oxide passes away to the chimney unconsumed, and we lose its calorific heat. Opinions differ considerably as to the exact quantity of steam which should be admitted to the producer; but all are agreed that its use is absolutely essential, as it keeps the producer cool, breaks up the clinker, and secures steady and regular working. From a calorific point of view, there is no gain in the use of steam; for it absorbs as much heat from the producer when being decomposed into hydrogen and oxygen as is given out by the hydrogen when burnt under the retorts with the formation of steam. It is interesting to note that while the steam enters the producer at a temperature of 212° Fahr., it enters the chimney as steam at a very much higher temperature—viz., that of the setting—and this means a loss of heat from the regenerator. Put briefly, the use of steam increases the volume of the products of combustion, diminishes their temperature, and increases the loss of heat through the chimney gases. If more steam is admitted than can be decomposed in the producer, the excess is harmful, as it goes to swell the volume of chimney gases, and aggravates the loss of heat from the setting. Hence it is desirable that the use of steam should have a limit—say, not more than 50 per cent. of the coke by weight.

In gaseous firing, the demand for secondary air is constantly changing, because of the variation in the composition of the producer gas during formation. Immediately before clinkering, the amount of carbonic oxide in the producer gas reaches a minimum due to the presence of the clinker, which restricts the admission area for primary air, and consequently the secondary air supply should be diminished. After clinkering, the primary air having a free passage through the hot coke gives a maximum of carbonic oxide in the producer gas, and hence a maximum supply of secondary air is necessary for complete combustion of the gases. Too little secondary air results in waste of fuel, through carbonic oxide passing to the chimney; and too much causes waste of heat, for the excess secondary air abstracts heat from the oven and regenerator on its way to the chimney. If a constant temperature is to be maintained in the oven, the admission area for secondary air must be varied from time to time by altering the position of the slide, so that it may be full open after clinkering, and from one-half to one-quarter open before clinkering. The maximum opening for secondary air should be an area of about 24 square inches, and the opening in the producer for primary air about 18 square inches.

Before closing, I will give a comparison between the results obtained by the independent producer for each oven and the outside producer plant. The independent producers are 4 ft. 10 in. diameter, by 7 ft. 2 in. high, and lined with 11 inches of fire-brick. The inside diameter of the brickwork is 3 feet, giving a producer area of 7 square feet, which is quite sufficient for heating either eight or twelve retorts. In both cases, the coke consumption for one producer is, on an average, 39 to 40 per cent. of the total make. In the case of the outside producers, the saving in fuel varies from 7 to 10 per cent., while the saving in labour is not less than 100 per cent.; and I have good reason to believe that 300 per cent. is much nearer the figure. As the results obtained by the outside producer plant at Glasgow (consisting of three producers and 180 retorts heated) are highly satisfactory, the following table which gives the inside brickwork areas should be interesting to the members:—

Area of each producer	34·0 square feet.
Total producing area	101·0 ,,
Main flue area	11·0 ,,
Delivery flue area	9·0 ,,
Distributing flue area	7·0 ,,
Dust chamber area	48·0 ,,
Outlet-flue from producer	2·5 ,,
Inlet to bench	1·5 ,,

The plant required for heating 360 retorts would be a duplicate of the one already quoted, making six producers with a total area of 202 square feet; and the additional flues necessary would have the same sections as those given in the table. One point worthy of mention is that if the gas is to be passed into the retort-house through two delivery flues, two dust chambers are necessary, and the area of each delivery flue is 9 square feet. If, on the other hand, the gas is to pass through one delivery flue, its area must be 18 square feet, and only one dust chamber is necessary, and the section of the main flue should be increased to 15 or 16 square feet on account of the larger volume of gas passing through the same length of flue. The cost of the steelwork, &c., for an installation of this kind will vary from £6 to £8 per retort, including roof over producers, platforms, inclined railway, flues, and casings, and the erection of the entire plant, except the lining material. At first sight, this may seem a high figure; but the great saving in labour and fuel which follows is sufficient to show that in a very short time the capital cost would be wiped out, and that an outside producer plant is a desirable acquisition to large gas-works.

Discussion.

The PRESIDENT asked the members to accord to Mr. Whitelaw a very hearty vote of thanks for his interesting paper.

Mr. L. HISLOP (Uddingston) inquired of Mr. Whitelaw whether he could give the members any idea of the quantity of coke required to carbonize 100 lbs. of coal, and what comparison it had with the old method of having one producer to each oven. He would also like to know whether the figures given had reference to the heating of through retorts.

Mr. WHITELAW replied that they were not through retorts.

Mr. HISLOP suggested that, as the paper was a very important one, it might be printed and circulated among the members.

The PRESIDENT said the Council had that evening decided to print a volume with all their transactions, and to give each member a copy.

Mr. R. C. COWIE (Glasgow) thought nothing had been devised that was better or more efficient, for cleanliness and handiness, than outside producers, for large works. There were one or two points in the paper which struck him as peculiar. Perhaps the author was anticipating when he said the open grate producer was now a thing of the past, because in many works it was still in use, and was likely to be. But even with an open grate producer, the primary air was under control. Mr. Whitelaw said the producers were clinkered once every eight hours. Did he mean the producers were burned down in that time? He (Mr. Cowie) knew that in oil-works the producers were clinkered once a week, though they were cleared at the bottom every eight hours. Mr. Whitelaw said that the slides for the secondary air should be altered for clinkering, and be opened again after the producer was re-filled. In systems such as that, he thought this would be a mistake, because with producers in sets of six they would all be delivering their gas into one main flue, and there would always be one at least burned for clinkering, and not making producer gas. Consequently, the quality of the gas would not, he thought, vary very much, so that there would always be some of the producers at their best, while one or two would be burning down previous to clinkering. The altering of the secondary-air slide might do where each oven had a producer for itself; but if this were to be done, it should not, in his opinion, be left to the stokers or firemen. He did not think they could be

depended upon always to alter the slides backwards and forwards while attending to the clinkering.

Mr. J. M'Leod (Provan), referring to the quantity of steam, said it was given as 50 per cent. According to figures which he had seen quoted, there was a good deal of difference from this. He remembered that in one paper, by Mr. Smith, it was put at 25 per cent.; and in another, published over the letter "O," at 27 per cent.; and in another at a much higher figure. It gave 0·07 kilogramme of steam to a kilogramme of coke. The one essential point was that the quantity of steam to go into the producer should be sufficient to prevent clinkering. Mr. Whitelaw gave the temperature at from 2000° to 2200° Fahr. This would undoubtedly be correct; but if this were the temperature of the retort, he should have objected very strongly, because it would be in excess of any he had ever seen used. In some papers the temperature was given at from 1750° to 1900° Fahr., and he knew that Mr. Maurice Graham, in his book, gave 1850° Fahr. as the maximum distillation temperature.

Mr. J. Webster (Provan) remarked, with reference to what had been stated about air-slides, that they had six producers working together, and they were clinkered once in 24 hours; so that, all over, they had one steady quantity of gas. They had five producers running, and one being clinkered.

Mr. M'Leod said this was a point he had forgotten. The idea of changing the slides periodically was, he considered, impracticable. They would require experienced men to stand by and change them from time to time.

The President pointed out that in some technical publications an invention had been described for opening and closing the inlet of the secondary air. He supposed it was an undoubted fact that the carbonic acid did vary slightly. If such an invention as that to which he had referred could be made to work automatically, it might be of advantage.

Mr. D. Currie (Paisley) said the meaning of Mr. Whitelaw's remark about the ideal producer being one which could be used with air only, was, as he gathered, that atmospheric air was to be used. Well, atmospheric air contained four parts of nitrogen to one part of oxygen; and it was really the oxygen that was wanted for the production of carbon monoxide. He supposed it would enter at the atmospheric temperature—say, 60° Fahr.—but would not leave the setting at that temperature. So that the four volumes of nitrogen must absorb a quantity of heat to assume the heat of the setting before leaving it. It might be difficult, in using steam, to arrive at the exact quantity to employ; but, supposing it were practical to arrive at it, steam was composed of water—hydrogen and oxygen—there was no nitrogen present, or practically none. Consequently, if the right quantity of steam to use could be arrived at, they would always be keeping down the percentage of nitrogen at the point of combustion. The steam, entering at 212° Fahr., and leaving at (say) 1000° Fahr. in the waste flues, and the nitrogen being only 4 per cent. of the total volume, they could understand that the heat absorbed by it was not a great deal, and that therefore there must be a benefit in the use of steam, beyond that of keeping the producer cool.

Mr. J. Dewar (Glasgow) said it had always been the practice in Scotland, so far as he was aware, to have pans, and also to blow in a considerable quantity of steam independently. He knew a contractor who had apparently formed the opinion that this was not the correct method of working; and so he did not make any provision for running steam-pipes along the flues. This arrangement was worked for several weeks, but ultimately it became necessary to put down steam-pipes, and blow in the quantity of steam which was thought to be sufficient. From a theoretical point of view, however, it was a mistake to put in an excess of steam.

Mr. Cowie asked if Mr. Whitelaw or Mr. Webster could tell how to start such a producer, so as to avoid an explosion.

Mr. Webster said that, in the first place, they put an outlet from the flues leading to the chimney right outside the roof, and all dampers leading into the settings were shut and hermetically sealed with fire-clay, so that no producer gas could get into the settings. Then they put in hot coke, and afterwards cold coke, and began to blow right through the main flues and out by the pipes (6-inch pipes, he thought) leading to the roof. They blew the carbonic acid through till the coke was incandescent. Then they began to gradually change the carbonic acid to carbonic oxide. They tested the gases every hour until they had sufficient carbonic oxide to produce a light burning permanently. After they got this, they put it into the settings; taking care to have the gas jet just above the damper, so that whenever the carbonic oxide came out it was ignited. They kept on doing this right along the settings, until they got them all lit. They did this for two or three days until the brickwork inside was red hot. Then they put out the gas, introduced the secondary air, and set it going. The right thing was to get the carbonic acid out through all the main flues, and heat up gradually until it was evolving carbonic oxide. In this way, there was no risk of explosion.

The President said he had made a calculation as to the quantity of coke employed, and, assuming that they had a large producer, supplying gas to about 60 retorts, and that each retort was carbonizing 18 cwt. of coal per day, the coke used per ton of coal worked out at 30 per cent.—that was to say, 30 per cent. of the coke from a ton of coal was used to carbonize it. Putting it another way, they used 20 lbs. of coke per 100 lbs. of coal carbonized. He thought it was not necessary to have an analysis of the gas in order to determine its calorific value, as this could be done by a calorimeter. He thought Mr. Whitelaw was very near the mark as to the quantity of steam to be blown in. He had given them half-a-ton of steam per ton of coke in the producer. Of course, there was a limit to the quantity of steam a producer would decompose; and he agreed that the less sent in the better. It was not at all an advantage to put in steam where the producer gases were to be used for heating purposes, if they could do without it. With a gas-engine it was different, because hydrogen was a necessary constituent of producer gas to be used in a motor. Unless they had about 15 per cent. of hydrogen, the gas would not ignite without the application of electricity.

Mr. Whitelaw thanked the members for discussing his paper in so very enthusiastic a manner. He did not quite catch Mr. Hislop's meaning as to the quantity of coke; but if he were carbonizing a certain quantity of coal, he would know how much coke he was making. If he wanted to ascertain the quantity required in the producers, let him take 40 per cent. This was a very good average. He obtained from Mr. Smith, of Tradeston, the result of observations he had made, extending over some days, and he found that it took from 39 to 40 per cent. This was with inside producers. With outside producers, it worked out at 30 per cent., which showed an economy of 10 per cent., in addition to which they had the enormous saving of labour that the outside producer plant effected. He had given the saving at from 100 to 300 per cent.; Mr. Webster assured him that it was often higher than the latter figure. So he did not think anything more was wanted to justify the adoption of outside producers in gas-works, even though they were on a much smaller scale than those at Provan. He admitted that he was wrong as to the eight-hour periods for clinkering. Mr. Webster said 24 hours; and he could not get past that. He said in his paper that the less steam used the better. He had been furnished by Mr. M'Leod with some analyses, and he found that for every pound of carbon consumed in a producer they must use somewhere about half-a-pound of steam. There was no doubt that the composition of the gases varied from time to time. If they had in a producer a quantity of coke the whole of which was available for primary air to go through, and it began to clinker, in course of time the area through which the air passed would be restricted, and that of gas production also. In a large plant such as they had at Provan, no such disadvantage as Mr. M'Leod had spoken of was experienced to any extent. The total quantity of air—primary and secondary—remained constant, and if they reduced the proportion of the primary air, they were taking in more secondary air at a time when they required less. Thus they had an excess of secondary air passing into the settings, and the result would be a reduction of temperature. He knew it was quite impracticable to alter the slides aright; but he observed the invention of which the President had spoken, and it seemed as if it would answer the purpose very well. He agreed that the less steam introduced into a producer the better; but they could not do without it. They might send in so much steam as to put the fire out altogether; and this, of course, limited the quantity of steam to be introduced. He thought an excess of steam was probably the worst evil of all in the working of a producer. It only went to swell the volume of the products of combustion, which was already large enough. He should like, before closing, to express his obligation to Mr. Wilson for the use of the drawings with which he had illustrated his subject, and to Mr. M'Leod for making the analyses of the producer and chimney gases; for, if he had not had these, he would not have been able to give his paper.

After the reading and discussion of a paper by Mr. J. M. Maconochie, of Glasgow, on the "Corporation Gas-Stove Department" (some extracts from which will be given next week), the proceedings closed. In the course of the day, a resolution was passed to have an excursion by sea, in the month of June; and it was left to the Council to arrange details.

Rotary Meter Company (1905), Limited.—In another part of the "Journal" will be found the prospectus of this Company, which has been formed with a capital of £20,000, in £1 shares, to acquire the British, American, German, and French patents for rotary gas-meters, and the British patents for rotary water-meters, together with the business and undertaking of the Rotary Meter Syndicate, Limited, and the benefit of a licence entered into with the Power Gas Corporation, Limited, in connection with Mond and producer gas, and another entered into with Meters Limited for water-meters. The Syndicate take 3600 shares as part of their purchase-money, the vendors 1500, and of the remainder 6900 are offered for subscription.

A Water-Works Gravity Tunnel.—In the new system of water-works under construction for the City of Cincinnati, the supply is taken from the Ohio River near the Kentucky shore, opposite the village of California (Ohio). It is conveyed from the intake pier by a tunnel under the river to the eastern pumping-station, where it is forced to the settling-basins. From these it flows, by gravity, through the filtration plant and the clear-water well into and through a gravity tunnel, a description of which was given in a recent number of "Engineering Record." The total length of the tunnel is 22,265 feet, or practically 4¼ miles. The general alignment is about parallel to the river, and at a distance 300 to 1000 feet from it. The average depth is about 130 feet below the ground surface, and about 25 feet below the surface of bed rock.

YORKSHIRE JUNIOR GAS ASSOCIATION.

This Association varied its proceedings last Saturday with a visit to the coke-ovens and bye-products recovery plant of the Yorskshire Coal and Iron Company, at Tingley, near Leeds. In spite of uninviting weather, and the difficulty of reaching Tingley from some parts of the West Riding, there was a very large muster of members, who, in parties of twelve, were shown round the works by Mr. Richard Purdy, the General Manager, and the various members of his staff. The element of the unexpected and the exciting was supplied by the news which met the members as they arrived that there had been an explosion in the mine that morning. Fortunately, however, it had not been accompanied by loss of life or serious damage. The visit would have been postponed, but for the difficulty of communicating with all the members at so short a notice; and those present felt themselves the more deeply indebted to the officials, who did so much for their comfort and edification on an afternoon when their thoughts were most naturally running in other directions.

The pit-head was first visited, the 75 feet high steel headgear, with 18 feet pulleys, being of most up-to-date construction, with some rather unusual features, was examined with much interest. The engine-houses were visited, and the manipulation of the winding apparatus watched with close interest, as also were the various signalling arrangements and the device for the prevention of the overwinding of the cage. The large coal is sold, and only the small coal is sent to the coke-ovens. This is washed, then disintegrated by breakers operated by electric motors, raised by bucket-elevators, and carried by a modified push-plate conveyor to the stamping machine.

The old bee hive coke-ovens, although still standing, have in practice been superseded by the Otto-Hilgenstock ovens and plant. In this, 8 tons of powdered coal are stamped in a mould into a large cake of such dimensions as practically to fill an oven. The carriage on which the mould stands travels along rails to the oven about to be dealt with; the spent charge is forced out by a ram; slaked as it emerges; slides down a sloping bench; and when cold enough is filled into the railway trucks for conveyance to blast-furnaces and foundries. The new charge is then carried into the oven, the plate carrier withdrawn, and the door replaced and luted all round. These operations were watched with close attention, as also the alternative method of filling the retorts through the top lids from travelling waggons discharging at the bottom. The hydraulic main and ascension-pipes are of heroic size compared with those found in gas-works; and each of the latter has an anti-dip arrangement. After condensation and washing, the gas is returned to the ovens, and burned in combustion chambers on either side of each oven by means of modified large bunsen burners. After travelling round and under the ovens, the hot waste gases are used in raising steam from three boilers. The gas not needed for the ovens is employed in driving a large engine of the Cockerill type, and in heating one or two steam-boilers, according to the amount that may be available, any further surplus being blown to waste, as there is no storage accommodation—the gas being completely dealt with as it is produced.

The gas is cooled in large annular condensers, each with four air passages, and finally in vertical water-cooled condensers, and then washed in tower scrubbers. The large Pelouze and Audouin tar-extractor was inspected, and the battery of pumps, one of which returns tar to the hydraulic main and thus keeps it constantly flushed. The tar is not dealt with on the premises; but the liquor is worked up into sulphate of ammonia, for which a complete and up-to-date plant is installed, including a steam-discharging saturator, centrifugal drying machine, &c.

Special attention was paid to points of construction and practice which differed from those in ordinary gas-works custom; and at the close of the visit all concurred heartily in the thanks conveyed to the Works Manager and staff by the officials of the Association. Recognition was cheerfully accorded of the unsparing efforts of guides and staff to make the visit as pleasurable and profitable as possible, which, with the intrinsic interest of the plant and operations, combined to make the afternoon's outing one long to be remembered.

GAS SUPPLY AT CLECKHEATON.

The Life of Mantles.

At the Meeting of the Yorkshire District of the Association of Municipal and County Engineers at Cleckheaton on the 18th inst., under the presidency of Mr. A. T. Davis, M.Inst.C.E., the County Surveyor of Shrewsbury, a paper on "The Municipal Works of Cleckheaton" was read by Mr. C. Lund, the Town Surveyor.

The author first described the combined electricity and destructor works, which had been erected under his supervision at a total cost of £25,000, and were opened on Nov. 21, 1902; the electrical equipment being by Messrs. Gibbings and Baker, of Bradford, and the destructor installation by Messrs. Meldrum Bros., Limited, of Manchester, on their "Simplex" regenerative system. He then gave the following particulars in regard to the gas-works, for which he acknowledged his indebtedness to Mr. George Niven, the Gas Engineer to the District Council. The purchase of the gas-works from the Cleckheaton Gas Company was completed in 1870, at a cost of £53,000; the make of gas at the time being about 30 million cubic feet per annum. Since then considerable extensions and alterations have been made to the works and plant, to meet the growing demands of the district, as at the close of last year the make was 105 millions. These alterations and additions cost about £12,000; but, owing to the rapid developments which have taken place in the use of gas for tempering wire and other purposes, the profits of the Gas Department have been such as to enable the Gas Committee to pay off a large amount of the original capital; and instead of the item appearing on the yearly balance-sheet as £53,000, it now stands at only £29,100, although the price of gas has been lowered from 4s. 6d. to 2s. 8d. per 1000 cubic feet, with discounts ranging from 10 to 15 per cent. Cleckheaton ward is lighted by about 350 public gas-lights and three electric arc lamps. The cost of public lighting in gas alone is about £600; but no charge is made upon the ratepayers. The illuminating power required by the Act is 14 candles; but 17½-candle gas is supplied. The number of consumers is 3000, of slot meters 1100, and of gas stoves and cookers 250.

The following is a brief description of the works: The retort-house contains five arches, 20 feet through, each arch containing eight D-shaped retorts, 22 in. by 15 in. by 20 ft. The settings are on the half-depth regenerative system; each arch being capable of producing, on an average, when fully employed, from 120,000 to 125,000 cubic feet of gas per diem with a minimum of coke—say, 11 lbs. per 100 lbs. of coal carbonized. The carbonizing plant is equal to a production of 600,000 cubic feet of gas per diem. There are six annular condensers, 30 feet high, and arranged in duplicate. The scrubbing plant consists of two tower scrubbers, of the height of the condensers. The washer is by Messrs. Holmes and Co., of Huddersfield, and is capable of dealing with 800,000 cubic feet of gas per diem. The exhausters are two in number, with engines combined, made by Messrs. George Waller and Co. They are on the triple-blade principle, and are each capable of exhausting 30,000 cubic feet of gas per hour. There are six purifiers, their dimensions being as follows: Four oxide boxes, 25 ft. by 15 ft. and 5 feet deep; two lime boxes, 14 ft. by 14 ft. and 5 feet deep. The station meter is of the rotary type, and was the first of its kind ever fixed. It was made by the Rotary Meter Syndicate, of Manchester. The gasholders are two in number. No. 1, known as the works holder, has a capacity of 250,000 cubic feet; No. 2, or the storage holder, which is fixed a little over a mile from the works, will store 500,000 cubic feet—thus giving a total capacity of 750,000 cubic feet. The heaviest output on one day up to the present has been 549,000 cubic feet.

At the close of the paper,

The President asked as to the cost and efficiency of the incandescent mantles in the public lamps.

Mr. Lund said he was personally of opinion that they were not a success for street lighting, as there was so much damage with them, and they were often going wrong.

Mr. Niven said he had made observation of the life of the mantles. As they had only about two dozen in the whole town, they had not gone in for mantle lighting on any large scale. He supposed he had not pushed incandescent gas lighting in Cleckheaton for the reason that they had electricity works which they wished to see established on a profitable basis. Yet he ventured to say that if he took up this lighting he should have no difficulty in proving to the Committee who have charge of it, and to the ratepayers, and particularly to Mr. Pickersgill, the Electrical Engineer, that he could give a cheaper and better light with gas than could be done with electricity. As to the life of the mantles, there was something peculiar about it. He had a lamp in which one mantle had been in use for eight months; whereas the other burner had had five mantles during the same time. He could not possibly tell how it was that the mantles on one of the burners went so quickly. He had put screens in the lamp, turned the burner round, and changed the mantles; but this mantle was there, and had been there for eight months. They changed the mantles, on an average, about once a month. In incandescent gas lighting, they did not want to be guilty of doing what had been done in most towns, and put mantles into the ordinary lamps, because if they did they would find out their mistake. The "draughting" of the lamps required attending to; and besides that they wanted to have their lamp-posts properly fixed, as the vibration of heavy traffic had a great deal to do with the life of the mantle. With careful manipulation and proper lighters, they ought to get a mantle to last for a month at least.

The London and Southern District Junior Gas Association will meet next Friday, when Mr. R. L. Fenner, of Poplar, will read a paper entitled "Ammoniacal Liquor and Its Working Up into Sulphate of Ammonia."

At the Society of Arts last Wednesday, Sir Charles Malcolm Kennedy, K.C.M.G., read a paper on "The Present Aspect of the Fiscal Question." In the course of it, he exhibited a diagram showing that of the total population of the United Kingdom, taken at 42 millions, 18½ millions are actively engaged in various occupations; 78,686 being in connection with gas and water supply and works of sanitation.

MAINTENANCE OF INCANDESCENT LAMPS.

In the "JOURNAL" last week, we gave the paper on "Gas-Mantles and Gas-Mantle Lamps from a Commercial Standpoint," prepared by Mr. W. R. Addicks, of New York, for the meeting of the New England Association of Gas Engineers. The paper led to a fairly good discussion, from which we extract a few points.

Mr. Nettleton, of New Haven (Conn.), related his experience in connection with incandescent gas lighting. He said they had not sent out any lamps without charge, but generally sold them, either at $7 apiece, cash down, or on the instalment system. If requested, they took charge of the lamps for 25 c. each a month; and they had about 1000 in hand. They had an inspection once a fortnight, and replaced all broken glasses, mantles, &c. The expenses were rather less than 25 c. per month. He believed firmly in selling the lamps, as when people had paid for them, even if it was only $2 down, they felt they had an ownership in them. When this was complete, they were very much more interested in the lamp than if it belonged to the gas company. He thought a company's interest lay in selling lamps, wherever this was possible; and he should favour charging less than cost price rather than letting them on hire at a rental. Mr. Nettleton was asked a question as to the number of lamps inspected; but he was unable to give any information on the point. Mr. Pease, of Lowell, said his average was 28 per man per day. In a four-mantle lamp they would use eight mantles in a year, or one every six months.

The next speaker was Mr. Dudley, who said there were various opinions as to the number of inspections a gas "arc" lamp required per month, but the consensus of opinion seemed to be that three were sufficient for keeping it in first-class order. Of course, local conditions governed this to a great extent. On the question of consumption also there was much diversity of view. Some companies estimated as low as 15,000 cubic feet per annum; whereas others ran it up to 28,000 cubic feet. Personally he thought a lamp of this kind would burn 20,000 cubic feet of gas in a year; and in comparison with a gas-stove it was considered in many cases to be more valuable. With regard to mantles, he thought the best were the cheapest in the end, as the lamps were kept in good condition, and were a better advertisement. Some companies would maintain an "arc" lamp with only 10 mantles a year; while others required as many as 22, and even more. If a lamp were maintained with one mantle a month, it would be a good low average; and at this rate the maintenance cost could be kept at a nominal figure.

Mr. Dudley was followed by Mr. Erhard, who said his experience of "arc" lighting was that they used about 12 mantles per lamp per annum, except in cases where there was a great deal of vibration or careless handling of lamps. The consumption varied, but it was roughly about 17 cubic feet per hour—being sometimes as low as 14, and at others as high as 20. He thought in "arc" lighting the effectiveness of the lamp was sometimes neglected. One of the arguments used against gas-light was that it was not pleasing. The use of an alabaster globe would very greatly improve the illuminating effect, and only reduce the light a trifle. To his mind, it was not desirable to direct a bright point of light horizontally from the lamp, but to throw most of it below the horizontal, and give a general illumination to a room. This was best accomplished by the use of an alabaster globe. A clear globe required a good deal of time expended in polishing it off; and this could not be given by the inspector. With an alabaster globe, however, all that was necessary very often was to dust it. The mantle was, of course, one of the most essential details. Personally, as a mantle expert, he would strongly recommend the use of a yellow-white mantle, by which he meant a mantle richer in cerium than was now generally used. This mantle was tougher than the dead-white one, and would certainly not shrink so much. Its candle power kept up very much longer. A very white mantle would have a fairly high candle power at the start, but at the end of 1000 hours' burning, it would drop sometimes 60 per cent.; whereas the yellow-white mantle, the same shape on the same burner, using just the same quantity of gas, would drop about 15 per cent. The use of special glassware to tone down the light and of a yellow-white mantle were, he thought, the most important features of incandescent gas lighting. In order to get the best lighting effect from a burner, the mantle must hang absolutely over the centre. This was also best for prolonging its life.

The next speaker was Mr. Slade, of Hartford. He said his men took charge of about 60 lamps per day. In his opinion, gas companies should have only one kind of lamp. His charge for maintenance was 40 c. per mantle per month; but this did not cover all the cost. It included labour, taking care of the mantle, and cleaning the glass. They used a good mantle and also an alabaster globe, as recommended by Mr. Erhard. No charge was made for the lamp or its installation. A question was asked by the Secretary as to the practicability of long mantles. He said that in the section of the town where he worked there had been quite a number of single lamps with long mantles put on, some of them apparently pretty good lamps; and, so far as he could see from casual observation, the mantles appeared to be standing up pretty well. He could point to a number of places where two of these long mantle single lamps had been put up instead of an "arc" lamp; probably saving a little gas to the consumer, and still giving him a pretty good light—in many cases probably all he could afford to pay for. Mr. Slade said he had tested both the short and the long mantle, and the conclusion he had come to was that the moment they used the long mantle they sacrificed efficiency. He thought he obtained with the short mantle a little more than 20 candles per foot, while with the long mantle the results were something like 12 to 14 candles.

Mr. Erhard remarked that the long mantle was more or less of a "fad" in America at the present time. The 4½-inch mantle was not so strong as the 3½-inch, as they were both made practically alike at the heads, but in the case of the former there was a good deal more weight hanging from that point. Then the shrinkage of the mantle after burning for some little time was more marked on a 4½-inch than on a 3½-inch mantle; and not only that, but the flame to light the former was necessarily very much longer in order to fill the mantle, and it was not nearly so hot. On an ordinary burner, the more air drawn into it the shorter was the flame; and in order to elongate the flame they sent in more gas, and did not draw in the same proportion of air. This was just as true on a single burner as it was on an "arc" light; and it was truer where there were no artificial means of inducing a draught, such as a chimney. So that, from the manufacturing standpoint, it was not highly to be recommended; but from the practical or consumer's standpoint it was to be deprecated, because the 4½-inch mantle, as Mr. Slade had said, would never give so great an efficiency as the 3½-inch, no matter on what apparatus it was employed. To be used most successfully, however, a 4½-inch mantle needed to have some artificial means for inducing air, and something in the way of a chimney. Standing alone on a burner, it would give very poor results. It was almost impossible, unless one had a very high gas pressure, to properly light the heads of the mantles. This was the experience in Europe about three or four years ago. They were using a good many long mantles then; but there were very few now.

In response to a request for information as to the consumption of gas by the long-mantle burners in single lamps, Mr. Erhard stated that it would be about 30 per cent. greater with the 4½-inch than with the 3½-inch mantle on the same burner, while there would be an increase of from 20 to 25 per cent. in illuminating power. Consequently, the efficiency was less with the longer mantle. As bearing somewhat upon the subject, Mr. G. G. Ramsdell made a few general remarks on the use of inverted incandescent lamps in the United States. He said it was found with these lamps that shortening the mantle resulted in the production of higher candle power. The first lamps sent over to America were not exactly suited to the large variation in the quality of the gases there. While abroad about nine-tenths of the gas was made from coal, and a small proportion only was water gas, in America the conditions were not the same; and the lamp had to be changed to suit the difference in specific gravity. They found that while they could fill the longer mantle, they could not get the efficiency out of it that they could with the shorter one. Therefore a change was made, and all the mantles now in use were short, except in the regions of natural gas, where no trouble was experienced in filling any length of mantle. Mr. Ramsdell added that the inverted lamp had reached a satisfactory condition. When once properly hung, it was superior to the gas "arc," but it must be acknowledged that it was less valuable to a gas company, because the consumption of gas by it was proportionately very much less.

Royal Commission on Coal Supplies.—Part XIII. of the final report of the Royal Commission on Coal Supplies has lately been issued. It consists of the replies of H.M. consular officers to a series of questions upon the maintenance of the British coal trade in foreign countries.

British Standard Pipe-Flanges.—A report recently issued by the Engineering Standards Committee (No. 10) contains a series of tables which will be of interest to engineers and others using flanged pipes for steam and water services. If generally adopted, the report will have the effect of obviating the disadvantages due to the unnecessarily varying requirements of consulting engineers, which have involved alterations to patterns and specially cast pipes, with consequent delays and increased prices. The only essential departure from general practice is to be found in the decision that the number of bolts shall in all cases be a multiple of four. This means that for certain small sizes of pipes eight bolts will be employed for some pressures in place of six as heretofore, while in the case of low-pressure pipes the six bolts will give place to four. It is believed that the advantages of the principle recommended are quite sufficient to counterbalance any possible disadvantages. Two of the tables contain standards for short bends and tees of cast metal, and for long bends of wrought iron and steel. The Joint Committee organized by the Company of Plumbers are engaged in the standardization of water pipes and fittings; but the findings of this body will not interfere with those of the Engineering Standards Committee, so far as concerns pipe-flanges. It is understood that the questions of screw-threads for wrought-iron and steel pipes, and of spigots and sockets for cast-iron pipes, will be left by the Plumbers' Committees to the two Engineering Standards Committees under the presidency of Mr. H. F. Donaldson and Mr. C. Hawksley respectively.

CONCENTRATING AMMONIACAL LIQUOR.

At the Annual Meeting of the New England Association of Gas Engineers, the following paper on the above subject was read by Mr. D. D. BARNUM, of Worcester (Mass.).

The principal source of nitrogen is coal, and most of the compounds of this element are made from gas liquor. Gas coal contains 0·5 to 2 per cent. of nitrogen; the average being about 1 per cent. When the coal is heated in a retort, the nitrogen unites with the hydrogen to make ammonia gas—slowly under a low heat, and quickly to a greater extent under a medium heat. But the gas is dissociated at 900°, and consequently too high a heat reduces the make of ammonia. Under ordinary conditions, from 15 to 25 per cent. of the nitrogen in the coal goes to ammonia, 50 per cent. into the coke, and the remainder to the tar and into the gas as nitrogen. Under further chemical action, the various salts form. These are absorbed by the water vapour in the gas, and when condensed we have the gas liquor.

Two classes of salts are formed, the volatile and the fixed. The ammonia in the volatile salts is driven off by simply heating. In the case of the fixed salts, lime or caustic potash must be mixed with the solution in order to distil off the ammonia. The principal volatile salts are ammonium carbonate, sulphide with some hydrosulphide, cyanide, and acetate. The fixed salts are ammonium sulphate, sulphite, and some thiosulphate, thiocarbonate, chloride, sulphocyanide, and ferrocyanide. The salts found in the largest proportion are the carbonates and sulphides; these being formed by the ammonia uniting with the carbonic acid and sulphuretted hydrogen.

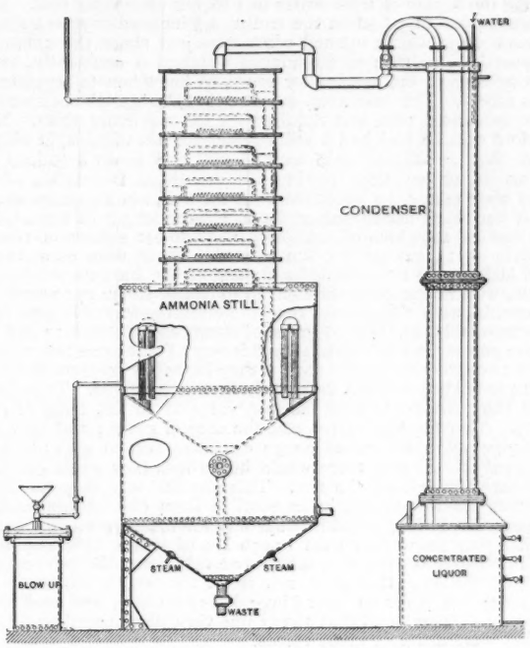
Water at 60° Fahr. absorbs more than 700 times its volume of ammonia; consequently more fixed salts are found in the liquor from the hydraulic mains than farther along in the process of condensing, simply because, the liquor being hot, the volatile salts give up their ammonia, and it is carried along until the condensed vapours are cool enough to absorb it, or until the gas is washed with fresh cold water—the fixed salts remaining in solution at a comparatively high temperature. A sample of liquor condensed out at 110° tested as follows: 1·21 per cent., or 4·84 oz.; 68 per cent. of the ammonia being fixed.

In our works the coal and water gases are mixed at the inlet of the exhausters, and go forward together from this point. The liquor condensed out of the combined gases at 80° Fahr. tested as follows: Total ammonia, 1·45 per cent., or 5·80 oz., 32 per cent. of which was fixed. The mixed gases pass through two sets of washer-scrubbers, arranged in series of two each. In the first set we use comparatively weak liquor, and the strength of that obtained varies on account of the different strength liquors introduced. In the second series, we used fresh water. A sample tested gave: Total ammonia, 2·77 per cent., 11·08 oz., 33 per cent. of which was fixed.

The amount of liquor obtained can be checked somewhat as follows: The quantity coming from the hydraulic mains, due to the water in the coal, measured 6·66 gallons per ton of coal, or 5·44 lbs. per 1000 cubic feet; a certain amount of hot water is run into the mains each day—averaging 3·3 lbs. per 1000 cubic feet; the temperature of the gas as it leaves the mains is 140°, and it is gradually cooled to 75° in the second series of scrubbers. There are, therefore, about 7·25 lbs. of water per 1000 cubic feet condensed out between these two points. Finally, we add 1 lb. of water in the scrubbers for every 1000 feet of coal gas. We have altogether a total of 17·24 lbs. of water that should contain the ammonia of 1000 cubic feet of coal gas. Our average make per ton of coal is 11,000 cubic feet, and the ammonia obtained from a ton of coal is 80 oz.; therefore, the 17·24 lbs. of water should contain 1-11th of 80 oz., or 7·37 oz. of ammonia, and a gallon of our average liquor should have 3·5 oz. of ammonia in it. This would give the liquor a strength of 10 oz.

The water gas enters the system at a final temperature so near 75° that its effect on the amount of condensed vapours can be neglected. The weak liquor entering the first scrubbers also had little or no effect upon this calculation, as its temperature is also close to 75°. That no ammonia is obtained from the water gas is due to the fact that ammonia gas is dissociated at about 900°, and it takes 1800° to dissociate steam; consequently, if the generator is hot enough to make water gas, it is hot enough to break up the ammonia gas.

The concentrating apparatus which we installed last spring is one built by W. L. Rowland, of Philadelphia. It has a capacity of about 6000 gallons of weak liquor per 24 hours; and its principal features are shown in the illustration. [The liquor tank and lime-cream vessel are not shown. The former is located just above the pipe to the left of the upper part of the still, and the latter at the side of the blow-up. The concentrated liquor is taken off by the small pipe below the test-cocks at the base of the condenser.] While the still is working, we keep a man in attendance, and it is run continuously until the stock of weak liquor is worked up. It is then shut down until the liquor accumulates again. The apparatus admits of nice adjustment, and, with ordinary care, does not give any particular trouble. The main precautions required are to have no tar in the weak liquor; to make a thoroughly mixed cream of lime; to keep the temperature at the inlet of the condenser within 10° of the mark it is found best to work at; to have plenty of water for condensing; and to keep the outlet temperature of the condenser within 10° of its prescribed mark. For this test we had available 6100 gallons of 2·5 per cent. or 10-oz. liquor, 40 per cent. of which was fixed ammonia. In carrying out the test, we used 293 lbs. of lime, which made 143 gallons of the cream of lime; about 9 to 10 gallons being used per charge of 400 gallons of weak liquor, which is 1 lb. of lime for 4·3 lbs. of ammonia obtained. We used 13,056 lbs. of steam, or 10·39 lbs. of steam per pound of ammonia.



ROWLAND'S APPARATUS FOR THE CONCENTRATION OF AMMONIACAL LIQUOR.

The steam is admitted to the still at a pressure of 20 lbs. per square inch. The labour amounted to 34 hours, or 36·94 lbs. of ammonia per hour. From the 6100 gallons of 10-oz. liquor, we obtained 856 gallons of concentrated 15·29 per cent. or 61·16-oz. liquor, which amounts to 1256 lbs. of ammonia.

The following is an analysis of a sample of the concentrated liquor taken at a different time from that at which the above test was made:—

Content.	Per Cent.
Ammonia	12·94
Sulphur	0·87
Carbonic acid	18·92
This would correspond to—	
Ammonium sulphide	1·85
Neutral ammonium carbonate	26·27
Acid ammonium carbonate	12·36
Ammonium hydrate	None.

An analysis of a sample of concentrated liquor obtained from a "straight" coal-gas works gave the following:—

Content.	Per Cent.
Ammonia	15·79
Sulphur	4·11
Carbonic acid	13·38
This would correspond to—	
Ammonium sulphide	8·73
Neutral ammonium carbonate	29·20
Acid ammonium carbonate	None.
Ammonium hydrate	2·22

The character of the Worcester liquor is very unusual, due to the scrubbing of the mixed gases. The sulphur is almost completely driven out of the liquor by the large excess of carbonic acid, forming not only neutral carbonate of ammonia but acid carbonate as well. The liquor from the "straight" coal-gas works does not contain any acid carbonate, but has in it a little ammonium hydrate.

In the course of the discussion upon the paper, the President (Colonel F. S. Richardson) remarked that there were in the "Question-Box" some queries that might be answered in connection with it. The first was: "What is the yield of ammoniacal liquor in ounce-gallons per ton of coal?" Mr. M'Kay, replying to this, said 240 ounce-gallons had been given to him as a standard; and he had not seen any reason for deviating from it, though in one instance which had come to his knowledge the yield was 352 ounce-gallons. This, however, was in Massachusetts, and in a coal containing 1·3 per cent. of nitrogen. The President said another question was: "What is the average strength and quantity of ammoniacal liquor per gross ton of coal collected at each of the several condensers and scrubbers in the cooling and washing system?" The author of the paper dealt with this question. He said that with 1 per cent. of nitrogen in

the coal, to get 5 lbs. of ammonia per ton of 2240 lbs., 0·18 of 1 per cent. of the nitrogen must go to make ammonia. This could be increased by adding steam, or by putting lime into the retort; but it was not a practical way of increasing the ammonia. The amount of nitrogen obtained in the ammonia was limited by the temperature in the retort. A low temperature was necessary. If they attained one of 900°, any ammonia made was dissociated. Mr. Gould asked what mechanical adjustment there was for regulating the supply of fresh water to 1 lb. per 1000 cubic feet. Mr. Barnum said they had on the end of a ¾-inch water-pipe a small branch cock, which, opened wide, gave just about the quantity required. The man in attendance watched it constantly, and, having been in the service for years, he knew how to regulate it to a nicety. The maximum amount that the branch cock would give was about what was required for the maximum make. Mr. Gifford said he had had a still running for five months, in which time they carbonized 5021 tons of coal, and made 8 gallons of 16-oz. liquor per ton. During the month of December, after they were taking the liquor from the tar-well, when perhaps some of it had been accumulating for a greater length of time, they carbonized 1296 tons of coal, and made 16,031 gallons of 16-oz. liquor, or 13 gallons per ton of coal. These were gross tons. Mr. M'Kay said it would be interesting if Mr. Barnum would explain, with reference to the item 10·39 lbs. of steam per pound of ammonia, what the average represented in the way of limits. Mr. Barnum said the total of 10·39 lbs. of steam was between 12 and 15 horse power. It was regulated in this way: There were two valves with two pressure-gauges; and if they knew the pressure was not going to fall below 80 lbs. they set the first valve at this. Then they had the pressure beyond the first valve at 80 lbs. most of the time. After the first valve came the second gauge; and then on the pipe after the second gauge came the second cock; and if they set this so that there would be 20 lbs., they would get this pressure through all the run. This was the way they ran it—keeping 20 lbs. as nearly as possible from one charge to the other. Mr. M'Kay asked in what way the measure was made by which they knew they used 13,056 lbs. of steam. Mr. Barnum said that to make this they set the two valves and the two gauges in just the way that they ran it for the length of the test, and then ran it for an hour (three different tests), and took the average. They found that they came very close together. The valves were ordinary globe valves.

The Informal Meeting of Scottish Gas Managers.—Mr. W. B. M'Lusky, of Perth, the Convener of the Informal Meeting of Scottish Gas Managers, intimates that the twenty-second annual meeting will be held in the Alexandra Hotel, Bath Street, Glasgow, at 1.30 p.m. on Wednesday, the 5th prox. Mr. J. Napier Myers, of Saltcoats, is the President this year. Members of the Committee of the North British Association are expected to be present and take part in the proceedings.

Technological and Scientific Dictionary.—We have received from the publishing firm of George Newnes, Limited, Part VIII. of the "Technological and Scientific Dictionary" now in course of publication by them, under the editorship of Mr. G. F. Goodchild, B.A., and C. F. Tweney. It extends from "Naphthoic acids" to "Petrol engine or motor," and it may be said to be essentially a "chemistry" number; the equations being very numerous. The get-up of the book is fully maintained; and when completed it will be a useful work of reference.

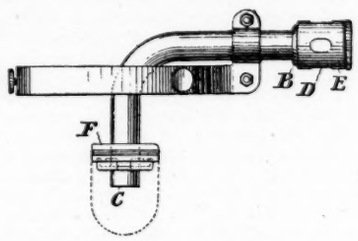
Incandescent Mantles for Russia.—The Board of Trade are in receipt, through the Foreign Office, of information to the effect that the Russian Customs Department have notified that annealed mantles for incandescent light are to be dutiable on importation into Russia under Article 169 of the tariff as "physical apparatus for intensifying light," at the rate of 10 rbls. 20 cop. per poud (7¼d. per lb.). Similar mantles, not annealed, of textile materials, even if impregnated with a mineral substance, are to pay duty according to the material of which they are made.

Riparian Owners and their Water Rights in America.—The appropriation of water for the supply of cities far removed from the intake is sometimes claimed in the United States to be warranted on the basis of riparian ownership, because of the possession of the fee to the land on which the pumping-station or other work is located. This has been denied in several States, and a short time ago the Supreme Court of Georgia gave a similar decision. The matter was mentioned in a recent number of "Engineering Record." In the case of the *City of Elberton v. Hobbs*, three points were settled in the following words: First, a municipality which buys a piece of land on a non-navigable stream several miles distant from its corporate limits does not thereby become entitled as riparian owner to take from the stream a supply of water for the inhabitants of the city. Secondly, the right of the owner of land through which a non-navigable stream flows to have its waters come to his land in the natural and usual flow, is inseparably annexed to the soil, is parcel of the land itself, and comes within the protection of the constitutional provision which forbids the taking of any private property for public purposes without just and adequate compensation. Thirdly, equity will enjoin a municipal corporation from taking a water supply from a stream in violation of the rights of a riprarian owner, though he may not at once be seriously injured thereby.

REGISTER OF PATENTS.

Inverted Incandescent Burners.—Kay, M., of Clapton, N.E. No. 5032; March 1, 1904.

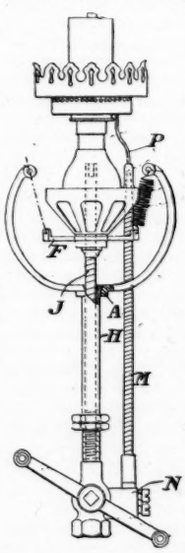
This invention relates to incandescent burners of the inverted type, so as to obviate the difficulties experienced in keeping the head of the burner at a proper temperature and in preventing the inductive action of the gas issuing from the nipple drawing in burnt gases instead of pure air.



The burner consists of a tube curved between the head or mixing chamber B and the point C of the burner, by the mantle. The burner is, as usual, provided with holes D for the admission of air, a nipple inside for the gas, and a sleeve E with holes which are adapted to register more or less with the holes in the mixing-chamber. By extending the burner and bending the tubular part, the burner-head or mixing-chamber is removed from the path of the hot gases issuing from the mantle.

A suitable device for supporting a mantle in a convenient position at or near the point C of the burner consists of a ring F with three internal lugs on it, which pass up through slots in a ring fixed to the burner. The ring has upstanding sides with vertical projections, the spaces between which form shallow notches in which the lugs rest, when the ring has been turned round and allowed to drop into the notches S.

Incandescent Gas Burners and Lamps.—Francis, A. S., of Farringdon Road, E.C. No. 5599; March 7, 1904.



The patentee proposes to suspend the burner by springs in a frame attached to the top of the supply-pipe or other suitable part, so that the vibration of the pipe or the lamp is not communicated to the burner and the life of the mantle thereby prolonged.

In the example shown, the frame is made in the form of a disc A, with a central hole and two or more radiating arms bent upwards. These arms have eyes or hooks at their upper ends, and springs are hooked into them and fastened below to a similar but smaller frame F, secured to the burner in any suitable manner. The larger frame is fastened on the gas supply-pipe H; and consequently the burner is suspended in such manner as to prevent, as far as is possible, any vibration being communicated to it. A flexible metal or other tube J is connected at its lower end to the gas-pipe and at its upper end is supplied with a connection which protrudes through the central hole of the frame F for the burner to be attached.

If a pilot light is used, a second flexible metal or other tube M is connected with a smaller valve casing N, and at its upper end has a plain nipple loosely inserted into the expanded part of the bye-pass tube P fixedly mounted on the burner.

Treatment of Carbonaceous Materials for the Production of Gas and Coke or other Carbonized Substances.—Bowing, J., of Tilbury. No. 6957; March 22, 1904.

This invention has for its main object "to improve the manufacture of gas for heating and illuminating purposes and of hydrocarbons by the employment as the heating agent within the retort of superheated steam."

The patentee takes coal suitable for gas making and crushes it—that is to say, reduces it to a condition such that it will pass through a screen of ½-inch mesh or thereabouts. The crushed coal is placed in a retort, and, by means of a boiler and superheater, or series of superheaters, a supply of superheated steam is passed into the charge. The steam pressure in the boiler need not be high—for example, it is quite practicable to work with a boiler pressure of 10 to 15 lbs. per square inch above the atmospheric pressure, although it is preferred to use such a pressure in the boiler as will deliver steam to the superheater at a pressure of 15 to 35 lbs. The steam issuing from the boiler is raised in the superheater to a high temperature—for instance, in the treatment of a charge of coal the temperature may be as high as 650° C., or even higher in the case of coal that will stand the higher temperature without becoming so plastic as to clog the inlets for the steam. This superheated steam is fed to the charge through perforated tubes, which afford a considerable aggregate admission area within the retort.

It is found that there is some tendency in the case of very bituminous coal for the coal to soften and form an impermeable mass—clogging

the admission of steam. With coal of this character, the temperature of the superheated steam should not exceed (say) 300° to 400° C. until the most volatile products have been driven over, when the residue will permit the high-temperature steam to pass freely through the mass. At these lower temperatures (not exceeding 300° to 400° C.), soft cinder is formed, but not coke. If, then, it is desired to obtain the solid residue of the charge in the form of soft cinder, the entire distilling operation may be carried through at the lower temperatures indicated. But it is found that, with certain kinds of coal, a point is reached in the course of the distilling operation at and after which the partially treated coal is no longer susceptible of the coming reaction. When this point is passed, the temperature of the superheated steam may be raised to any point necessary to effect a satisfactory completion of the operation without producing coke as the eventual residue. But if coke is desired, the temperature of the superheated steam used for producing the coking reaction should be raised to about 650° C.

The coal gas and other distillates thus obtained from the coal are carried to suitable condensing apparatus, where the steam and con-

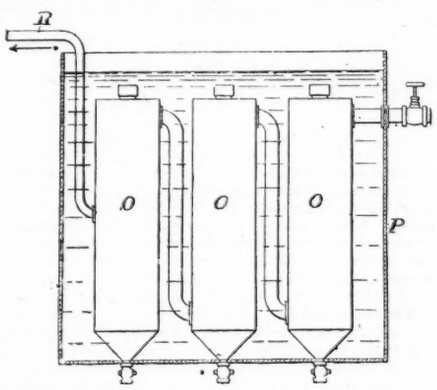
densible products are separated from the permanent gas. The latter is then treated in the ordinary way for purifying it, and rendering it fit for use as a heating or illuminating agent. If illuminating gas and coke are the products for which the process is being worked, it may be arrested at this stage; but if water gas also is to be produced, a further treatment with superheated steam may be employed, and any desired proportion of the coke produced may be converted into water gas and the residue obtained as coke by arresting the further operation at a suitable stage in the working of the process.

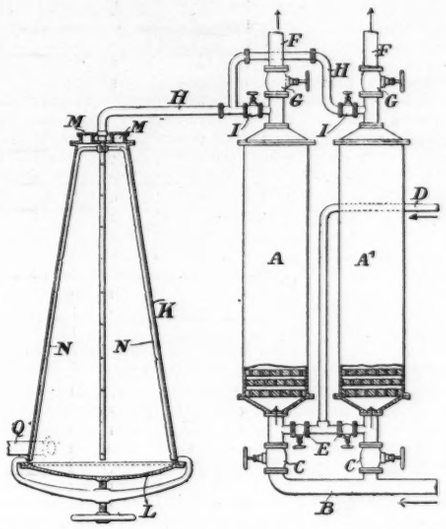
When it is desired to obtain water gas rapidly and in quantity—either separately or admixed with illuminating gas—the temperature of the steam admitted to the retort must be raised considerably above the point indicated. It is found in practice that when coke has been formed in the first part of the process, a temperature of 1000° C. is suitable for the further treatment of the coke to produce water gas; and the same temperature would, of course, be suitable for the treatment of a charge of coke specially introduced for treatment. At this higher temperature, the coke itself is attacked by the steam; and carbon monoxide and hydrogen are formed. Furthermore, if the water gas is generated, not from coke but from soft cinder, the temperature at which it is given off will be appreciably lower than 1000° C.

In case it is desired to obtain water gas and illuminating gas separately, the distilling operation is conducted as already described—that is to say, the illuminating gas is distilled off at the lower temperature specified; and the coke (or soft cinder as the case may be) left in the retort as the residuum of this first operation is treated by means of superheated steam at the higher temperature for the production of water gas. But if heating gas only is required, the whole operation from the beginning may be carried out with steam at the highest temperature the material under treatment will stand. In this case, the resulting gas will be of a complex composition, but suitable nevertheless for use in gas-engines and for other purposes in connection with which the illuminating property of the gas is unimportant.

This improved process of gas manufacture is adapted not only to the production of coke and the manufacture of coal gas, it may also be applied to the obtaining of analagous products from other carbonaceous materials—such as wood, peat, lignite, household refuse, and the like. From these materials water gas is obtained at a much lower temperature than that specified—for instance, water gas has been obtained from sawdust at a temperature of 500° C. and the hydrocarbon distillates at a proportionately reduced temperature. In the case of these materials, there is no such tendency to soften and form a plastic mass as in the case of coal; and to this extent the operation of the process is simplified.

In the sectional elevation showing the main features of the apparatus, A A^1 indicate two superheaters (which can be used alternately), consisting of chambers within which bricks of refractory material are piled, and which are adapted to be heated by gas supplied through a pipe B; the pipe having in it cocks C, for cutting off the gas from either superheater. D is the pipe through which the steam from the boiler is introduced into the superheaters in connection with each of which a cut-off cock E is arranged. F are pipes through which the products of combustion from the superheaters escape; each pipe being provided with a cut-off cock G. H is the pipe through which the superheated steam passes to the retort; a cut-off cock I being arranged in connection with each superheater. K is the retort, in the form of an inverted cone, for the purpose of facilitating the discharge of the residue of the distillation, and having a removable cover plate L at the bottom, and provided at the top with apertures M for introducing the material to be treated into the retort. Within the retort, and adjacent to the walls, is arranged a series of perforated tubes N connected with the superheated steam pipe H, and by means of which the superheated





steam is distributed in the retort, so as gradually to permeate the mass.

In the manufacture of coal gas and other products which do not involve the decomposition of steam, it is necessary to provide suitable apparatus for condensing the large proportion of steam which passes from the retort. For this purpose the dried gas is led from the condenser to a purifier, where it undergoes the ordinary finishing treatment; O indicating a series of chambers united together in a tank P supplied with cooling water, the first of the series being connected with the bottom of the retort by a pipe Q, and the last with a pipe R through which the gas is passed to the purifier.

"It is found as the result of experimental working that, even when water gas is formed within the retort, free steam comes over with the gas and must be separated in order to bring the gas into a fit condition for storing and use."

Discharging Retorts.—Hunter, W. D., and Barnett, W. A., of the South Metropolitan Gas-Works, Rotherhithe. No. 8689; April 15, 1904.

This invention relates to the discharging of the coke from through retorts; the object being "to prevent the wear and tear on the retorts occasioned by the present modes of discharging."

The apparatus for effecting the discharge is operated by a hydraulic cylinder mounted on a carriage capable of being run along in front of the retorts, and so disposed as to be raised or lowered according to the varying heights of the retorts from the ground. At the rear end, the cylinder is connected to the power main, and a valve is provided by which the power may be diverted for the purpose hereafter explained. Working within the cylinder are tubular hydraulic rams, sliding one within the other telescopically—the head of the smallest ram carrying a pusher-head.

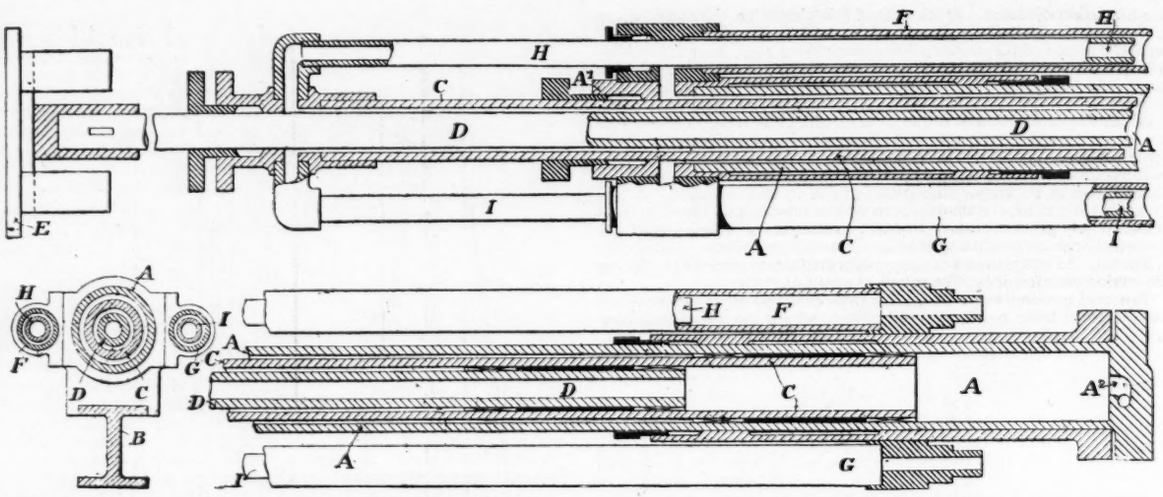
The illustrations next page show in plan view, partly in section, the front or pusher-head end of the hydraulic cylinder with the rams partly extended, a similar view of the rear or outer end of the cylinder and rams, and a cross section. Two rams only are shown, though there might be a series.

A is the hydraulic cylinder provided at its front end with a stuffing-box A^1 for one of the hydraulic rams to pass through. At its rear end is a port A^2 communicating with a pressure valve upon the rear end of the cylinder. This valve is of ordinary construction, and it has not been considered necessary to show it. The cylinder, with its valve, is rigidly attached to a joist of light section B, to the bottom of which is fixed a swivel thrust-block, which will allow the rams to follow any irregularities in the retort being discharged. The cylinder is suspended by chains in a frame of suitable construction mounted upon wheels, so that the whole apparatus may be traversed along the front of the retorts.

Within the cylinder A are two tubular hydraulic rams C D working telescopically; the ram C acting as the cylinder to the ram D, leaving annular spaces between the two rams and between the ram C and the wall of the cylinder. Both the rams are packed externally at their rear ends; the packing being kept in position by rings fixed upon the outer surface of the rams forming pistons, which work in the annular spaces before mentioned. The ram C is provided at its front end with a stuffing-box through which passes the ram D, which is formed with a solid end, to which a pusher-head E, of suitable construction, is fitted by a socket and cottar.

Carried upon either side of the cylinder A are pipes F G, provided at their front ends with stuffing-boxes and ports or passages communicating with the annular space in the cylinder. Within these pipes F G, and passing through the stuffing-boxes, are sliding tubes H I; an annular space being left between the inner face of the pipes F G and the outer face of the tubes H I.

The machine being brought in front of the retort to be discharged, the valve is actuated to allow the power to enter by the port A^2 into the cylinder A; the pressure acting upon the interior of both the tubular rams C D, so that they commence to move forward. The ram D may be more lightly packed than the ram C, and so would commence to move out first, and would carry the pusher-head E into the retort. When the head on the ram D comes in contact with the coke in the retort, the resistance offered to the pressure is greater than that offered

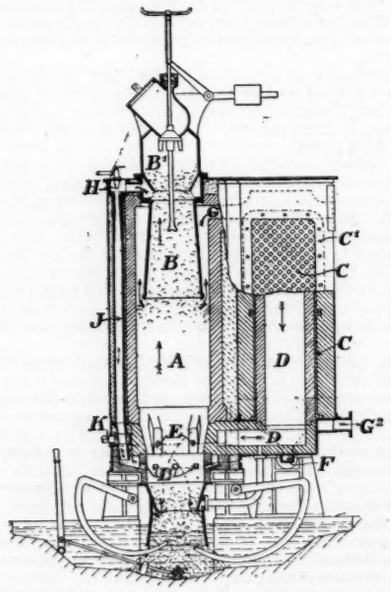


by the ram C; and therefore the pressure will force the latter ram out of the cylinder (as well as the ram D) to its full extent, until it is stopped at a predetermined point, after which the pressure will continue to act upon the ram D and force it out to its fullest extent. The pusher-head E will now have traversed the length of the retort and have cleared the whole of the coke from it.

It is then necessary to withdraw the rams and the pusher-head from the retort. To effect this movement, the valve is reversed, thereby directing the power to the pipes F G, and at the same time connecting the port A^2 with the exhaust. The pressure in the pipes F G will be communicated through the tubes H I and ports to the annular space between the rams, and will act upon the packing ring or piston carried by the ram D to withdraw the ram and pusher-head. At the same time the pressure will act upon the packing ring or piston on the ram C, and withdraw it into the cylinder A. The fluid in the cylinder A will pass away to the exhaust. The machine may then be moved to the next retort to be discharged, the ram cylinder raised or lowered as required, and the operation repeated.

Manufacturing Producer Gas.—Tonkin, W. W., of Brixton, S.W., and Puplett, S., of Victoria Street, Westminster. No. 8827; April 16, 1904.

The objects of this invention are "to produce from cheap bitumenous fuel a gas containing in a permanent form the whole of the volatile products of the original fuel, also to utilize the waste heat of the gas to heat to as high a temperature as possible the incoming air blast, and to generate the steam or aqueous vapour required; to facilitate the prompt restarting of producers that are worked intermittently; and to effect improvements in the general details of the apparatus."

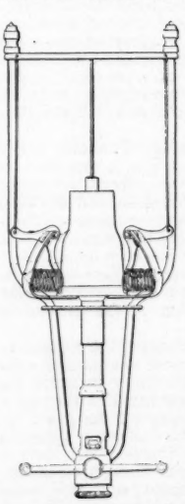


The producer is of any well-known form—preferably with an open bottom and with a water-seal such as are described in patent No. 15,498 of 1902, and with an internal retort as shown. The condensable products distilled from the fresh fuel by the hot gases passing through the fuel from the combustion chamber of the producer may then be drawn away (by any convenient means) with or without an admixture of steam or of air. By preference, they are taken away from the top or cooler portion of the producer or the retorts; and the present improvements comprise, *inter alia*, the method of introducing these mixed vapours into the fuel-bed, by preference through ports, passages, or openings below or behind the principal air-inlets, in order to insure that the condensable products shall pass through the hottest zone of combustion on their way to the gas-outlet, and thereby become split up into permanent gases. It is usual to introduce these condensable products into the producer above the zone of combustion—that is, between the air-inlet and gas-outlet; and therefore not into the zone of greatest heat—the result frequently being that only part of the tar is split up, and the carbon then set free, being surrounded by hot gases with which it cannot combine (such as CO, H, and N), is carried forward with the gas as soot, and causes subsequent trouble. The condensable products are compelled to pass through the actual zone of combustion in which free O, CO_2, and H_2O are pressed at sufficiently high temperatures, and in sufficient quantity, to split up all the tarry products and to combine at once with the liberated carbon or soot—thus converting the whole of the tarry products into permanent gases before they leave the producer.

A is the producer; B, the retort; and C, the heat exchanger, constructed similarly to that described in the 1902 patent, but fitted with cleaning doors C^1. D is the internal pipe for conveying the heated air blast to the tuyeres E. F is the cold-air inlet; and F^1 the air-passages up the exchanger C. G is the hot-gas outlet from the producer to the heat exchanger; and G^1, the gas-passages down the exchanger leading to the cooled-gas outlet G^2. H is a steam injector or blower for drawing the condensable products away from the producer and the retort, and causing them to pass down through the pipe J, the cock or valve K, the passage L, and the ports or openings L^1, into the fuel-bed below or behind the air-tuyere E. The openings L^1 may be of any convenient number, preferably placed at equal distances around the circumference of the producer; and the passage L may be of a plain ring shape surrounding the openings L^1, or else formed of suitable shape to facilitate cleaning from outside.

Anti-Vibration Fittings for Incandescent Gas-Burners.—Burley, J. D. C., and Gilmore, A. E., of Stourbridge. No. 9328; April 23, 1904.

This invention has for its object to provide spring suspension-fittings which will absorb or neutralize vibration and protect the suspended mantles from damage or destruction, without the employment of spiral springs, "which are liable to become weakened from over-distension and other causes after they have been for a short time in use." Another object is to provide means for preventing the "dithering" of the burner prior to it assuming a state of quiescence or coming to rest after oscillation or vibration.



According to one form of the invention, the burner is suspended from a ring or series of three or more surrounding bracket arms or uprights with inwardly bent or cranked upper ends, by means of a series of freely or loosely jointed, but indistensible, suspension links or depending connections whose lower ends are similarly connected to a series of bell-cranks fulcrumed to a plate, ring, or other attachment on the suspended burner, and levering or pulling on to special spring arrangements or devices provided for the purpose of absorbing or neutralizing vibration and preventing "dither." These levers are, in the arrangement shown, pivoted to swing or rock vertically to pairs of ears or lugs on the edges of a ring or plate surrounding the burner, and are disposed with their longer arms projecting radially in approximately horizontal planes, while their other and shorter arms hang downwards from the joints, and their extremities work in radial slots cut in a second ring, plate, or the like also attached to the burner-tube, but disposed in a lower plane than the first-named plate. These slots serve both to limit the angular or rocking movement of the arms or levers and also as a means for preventing over distension or undue yielding movement of the check-spring devices arranged for the purpose of opposing the movement of the arms, and so absorbing the vibration.

The spring devices are mounted on the lower plate in which the radial slots are formed; and they consist of pairs of light spring arms the free ends of which are threaded from the opposite sides respectively through holes at or near the ends of the levers, and so arranged that normally they tend to retain the levers at the inner ends of the radial limiting slots in the plate, but are capable of yielding to admit of the levers making slight angular movements in allowing for, or following and compensating for, the vertical movements which the suspended burner makes when under the influence of tremor or vibration.

Incandescent Mantles.—Crossley, E., of Liverpool. No. 9622; April 27, 1904.

According to this invention, after the mantles are made in the ordinary way, they are dipped into hydrochloric acid, and then, after removal from the acid, are left for about twenty-four hours to bake and harden. This treatment also, the patentee says she believes, "purifies the rare earths used in the manufacture of the mantles." To give greater strength to the mantles, they are next dipped in a solution of platinum—bichloride of platinum—to which a dye (as chrysoidine) may be added.

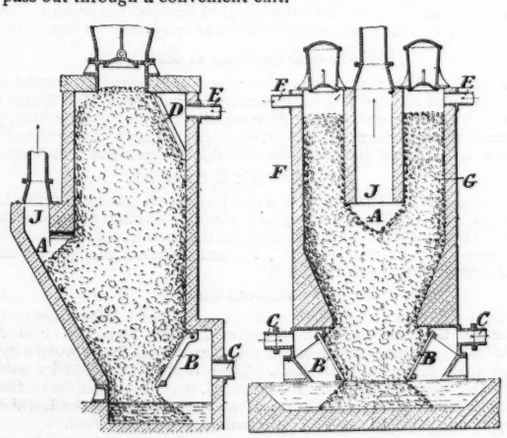
Opening and Closing Taps or the like at Predetermined Times.—Gunning, J., of Bournemouth. No. 9764; April 28, 1904.

This invention relates to mechanism by which gas or water taps or electric switches or the like are automatically opened and closed at predetermined times. The taps or switches may be of any known kind, so long as they are successively opened and closed by being rotated through a definite angle in a constant direction. For this purpose there is interposed between the timing mechanism and the tap or switch a driving spring of suitable length, one end of which is fixed to the frame-work and the other to a spindle on which the spring is wound. This spindle is connected with the tap or switch—for example, by means of a ratchet and pawl connection—in such a manner that when the spindle turns to unwind the spring, the tap or switch must turn with it; while, when the spindle is turned in the opposite direction, to wind the spring, the tap or switch is prevented from turning.

The patentee confines his lettered drawings to an arrangement for actuating an electric switch, so they need not be reproduced. He claims: (1) A tap or switch adapted to be successively opened or closed by successive angular displacements in the same direction; a driving motor adapted to turn the movable part of the tap or switch in one direction; detents normally locking the motor; and means for successively tripping the detents to release the driving motor—the detents alternately acting as stops by means of which the tap or switch is arrested at the open and closed positions respectively. (2) When the timing mechanism and the opening and closing mechanism are actuated by independent motors, a pair of pivoted levers arranged to be successively tripped by the timing device so as to release the motor actuating the movable part of the tap or switch, and alternately therewith to act as stops whereby the movement of the tap or switch is arrested at the open and closed positions respectively.

Gas-Producers.—Schweich, E., of Hyde Park Square, W. No. 11,268; May 16, 1904.

A gas-producer constructed in accordance with this invention (and one particularly useful when treating materials containing large amounts of volatile constituents) consists of a chamber containing the fuel, and so constructed that the air or air and steam blast is admitted both at the top and bottom of the chamber, while the delivery-exit for the produced gas is practically midway between the upper and lower blast inlets—these being preferably respectively projected through the fuel towards the centre of the mass at an angle so as to cause the gas produced in the upper and lower sections to meet at or about the gas-exit, and thus create in a single chamber two separate gas-producing zones of approximately equal depth, the gases from which intermingle and pass out through a convenient exit.



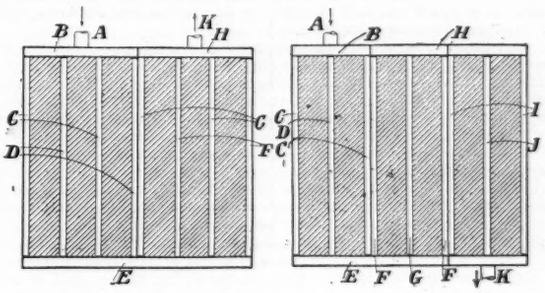
Two forms of such producers are given. In the first one there is a generating chamber wherein two of the opposite side walls are built perpendicular for some distance below the top, and one wall is then sloped towards the other and extended out beyond the vertical line of the top wall so as to produce a space A opening into the gas-exit. The lower wall is provided with a number of bars or grids B, which may extend across the entire producer if desired, and through which a blast of air or steam and air from the pipe C is projected at a suitable ascending angle into the fuel contained in the body of the generator. At the extreme upper part of the wall is a second similar arrangement of grids or openings D, through which a second blast of air or steam and air is projected from the pipe E at a descending angle also through the fuel in the chamber. The lower part of the chamber terminates in a water-lute, through which the ashes and other residue are withdrawn.

The second form of producer comprises two upper generating chambers F and G terminating in one lower combustion chamber provided with a water-lute. The upper part of each generating chamber is provided with inlets for air and steam blasts, which are directed downwardly through the fuel in the chambers. The combustion chamber is also provided near its base with inlets C for air and steam blasts, which are projecting upwardly through the fuel toward the centre of the mass. The exit J for the generated gases is midway between the two upper chambers of the producer, and projects into the mass of the fuel to some distance below the level of the latter in the two upper chambers.

Purifiers.—Cutler, S., jun., of Millwall. No. 29,474; Dec. 31, 1904.

This invention has particular application to purifiers on the Jäger system, as described in patents No. 19,644 of 1902 and No. 14,970 of 1903.

Where the purifiers are of large dimensions, or where two kinds of purifying material are to be used in one purifier, it is sometimes convenient to divide the purifier into two or more sections, through which the gas can pass in succession; and in order to accomplish this, the patentee proposes to divide the inlet and outlet chambers (which are usually constructed so as to extend along the sides, ends, or bottom of the purifier) into a series of smaller chambers by division walls in the manner shown in the illustrations, or, alternatively, as separate chambers with communicating ducts.



The first is a plan of a purifier divided into two sections. The gas enters at A, passes through the distributing chamber B into the inlet conduits C, and thence through the purifying material into the outlet conduits D and the collecting chamber E, where it is again distributed between the inlet conduits F, and passing through the second strata of purifying material into the outlet conduits G is collected in the chamber H, and is discharged from the purifier at the outlet branch K.

The second shows a purifier divided into three compartments with inlet conduits C, F, I, and outlet conduits D, G, J, and is adapted for using three grades or kinds of purifying material. The divisions may be either permanently fixed or made adjustable so that the dimensions of the compartments may be varied when required.

The patentee concludes his specification thus: "The pressure required to pass gases through purifiers fitted on the Jäger system is so small that it is quite practicable without accumulating undue pressure to divide a purifier into two or more compartments for use with different grades or descriptions of purifying material in the manner described."

APPLICATIONS FOR LETTERS PATENT.

5216.—Kramers, J. C. H., "Gas making." March 13.
5246.—Morrison, G. W., "Gas-turbine." March 13.
5247.—Nehemias, A., "High-pressure burners." A communication from J. Trope. March 13.
5265.—Mewes, R., "Incandescent light." March 13.
5340.—Gibbons, W. P., and Reed, E. A., "Conveyors." March 14.
5351.—Sheppard, W. D., "Gas-cookers." March 14.
5364.—Kelly, T. D., and Billington, W. J., "Supply of gas under pressure for heating and lighting purposes." March 14.
5398.—Hateley, H., "Gas-fittings." March 15.
5402.—Simmance, J. F., and Abady, J., "Photometrical apparatus." March 15.
5404.—Schmitz, W. J., "Gas-burners." March 15.
5429.—Warburton, J. A., "Gas-saver." March 15.
5436.—Smith, W. B., "Incandescent burners." March 15.
5462.—Scott-Snell, C., and the Air Light Company, Ltd., "Controlling gas and air distribution systems." March 15.
5472.—Clarke, C. A., and Rossiter, W., "Prepayment meters." March 15.
5476.—Tully, C. B., and Wall, J. W. R., "Removing deposit from ascension-pipes." March 15.
5481.—Ifö Kaolin-Och Chamottefabrik, A. B., and Mohr, O., "Retort-furnaces." March 15.
5503.—Sutcliffe, H., "Securing sheets of glass in street-lamps." March 16.
5606.—Dellow, J. E. & C. W., "Anti-vibrators." March 17.
5609.—Hendry, J., "Gas water-heater." March 17.
5652.—Brooks, B. W., "Gasaliers." March 17.
5678.—Maschinenfabrik Grevenbroich, "Gas-turbines." March 17.
5700.—Bray, J. W., "Inverted burners." March 18.
5702.—Lynde, F. C., "Mantles." March 18.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Street-Box Explosions.

SIR,—I have read with interest the remarks under the above heading in the last number of the "JOURNAL." It may be interesting to some of your readers to know that a little while ago we were very much troubled with explosions in street boxes; and the idea occurred to us of suggesting to the Electrical Engineer the filling-up of the boxes with sand. This was done more than twelve months ago, and since then we have not had a single explosion.

G. HELPS.

Nuneaton, March 22, 1905.

The Salary Offered at Margate.

SIR,—On p. 715 of the "JOURNAL" for the 14th inst., you criticize a statement which I felt called upon to make in defence of the course taken by the Board of the Isle of Thanet Gas Company, and put forward certain conclusions which I hold to be demonstrably fallacious and misleading. I desire to reply briefly to that criticism, and, if permissible, to correspondents who have written to me privately on this subject.

In passing, may I mention that one anonymous writer (courageously frail), "willing to wound, and yet afraid to strike," compares the area supplied by my Company with that of a Company whose population and area of supply stand in the ratio of one to six to that of the Isle of Thanet Gas Company. [Parenthetically, allow me to state that our title is now a misnomer, arising from the fact that the districts of Ramsgate and Broadstairs have their own works, and our Company at this period supplies Margate only].

Mr. James Dougall—at whose promotion we rejoice—was engaged at a salary of £250 per annum. He retires from the engineership of the Isle of Thanet Gas Company in the enjoyment of £550 per annum. I mention these facts to show that the members of my Board are not open to the charge of want of appreciation of meritorious services, which might be inferred by your editorial and other comments.

Our advertisement stated that the commencing salary of the new Engineer was to be £325 per annum, *plus* other advantages; and though I do not consider I am at liberty to mention the names of any candidates, yet I may be allowed, speaking generally, to say that we had gentlemen of undoubted eminence and practical experience in the profession applying for the position, who furnished testimonials from the highest authorities in the gas world, and who expressed themselves as quite prepared to undertake the responsibility of the position on the terms stated by the Board, whose policy has always been to consider the welfare of the employees on a par with the interests of the public and of the stockholders.

WM. LEACH LEWIS, J.P.,
Director of the Isle of Thanet Gas Company.

Margate, March 23, 1905.

[It would be extremely convenient if correspondents discussing editorial matter would take rather a shorter time than ten days to evolve the answer to be made. Now that Mr. Lewis has sent a letter purporting to be a reply to our criticism, we look in vain in it for his exposure of what he holds to be our "demonstrably fallacious and misleading conclusions." We are extremely pleased to learn that Mr. James Dougall retired from the engineership of the Isle of Thanet Gas Company in the enjoyment of £550 per annum, after having had to work on such scant remuneration as £250. The £550 is, judging by a recent advertisement, about the figure at which he should have commenced; and we do not therefore regard this as a proper "appreciation of meritorious service." The Rotherham Gas Committee were last week advertising for an Engineer and Manager at a commencing salary of £500—£175 more than the Isle of Thanet Gas Company offered. If Mr. Lewis will take the trouble to turn to the last issued Board of Trade returns, he will find that at Rotherham in the year ending March 25, 1904, 24,639 tons of coal were carbonized. The corresponding returns for Margate would be those for 1903, in which year 26,543 tons of coal—nearly 2000 tons more—were carbonized. Then why should Rotherham have a commencing salary of £500, and Margate only £325? We take it that the responsibilities at Margate are the same when the new Engineer takes them in charge as when Mr. Dougall gives them up; and in the interests of the public, the shareholders, and the gas profession, we reassert that the salary of £325 is not an adequate one. The more convinced are we than ever of this now that the gentleman is known who is undertaking the work (for reasons of his own) at such a low salary.—ED. J.G.L.]

Sales of Gas Stock.—A few days ago, Messrs. Nightingale, Phillips, and Page sold by auction £10,000 of consolidated ordinary stock in the Kingston Gas Company. The dividend paid in respect of the last half year was at the rate of 5⅛ per cent. Bidding was very brisk; and the price paid for the first few lots of £100 of stock—£110 10s.—gradually improved until £112 was reached. The total amount realized was £11,147. On Thursday, Messrs. Garrod, Turner, and Son sold by auction £3000 of new "C" stock in the Ipswich Gas Company, on which a dividend of 10 per cent. is paid. The prices realized ranged from £220 to £225 per £100 of stock; the total proceeds of the sale being £6600.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills read a second time and committed: Llandrindod Wells Urban District Council Bill, Shepton Mallet Gas Company (Electric Lighting) Bill.

Bill reported, read the third time, and passed: Leeds Corporation (Consolidation) Bill.

The opposition so the Hessle Gas Bill and the Truro Water Bill has been withdrawn.

HOUSE OF COMMONS.

Monday, March 20.

EXPLOSIONS IN TELEGRAPH INSPECTION CHAMBERS.

Sir THOMAS DEWAR asked the Postmaster-General whether his attention had been called to accidents reported by the Metropolitan Police as being due to explosions caused through gas escaping into telegraph inspection chambers and coming into contact with leakage in an electric wire; and whether he would state what compensation had been paid for injuries which such accidents might have caused, and what action had been taken to prevent their recurrence.

Lord STANLEY said his attention had frequently been called to the matter; but, as he had already told the honourable member, in reply to his question of last session, he had not seen any reason to suppose that explosions had been due to a leakage in a telegraph or telephone wire. No compensation had been paid by the Post Office, which had not been in any way in fault. The Engineers were, however, considering whether there was anything the Department could do to diminish the danger arising from the escape of gas.

The following further progress has been made with Bills:—

Bill reported, preamble not proved: Gaslight and Coke, South Metropolitan, and Commercial Gas Companies Bill.

Bills reported, with amendments: Epping Gas Bill, Higham and Hundred of Hoo Water Bill, London Gas Bill, Loughborough Corporation Bill, Morley Corporation Bill, Seaham Gas Bill, South Metropolitan Gas Bill, South Suburban Gas Bill, Sunderland and South Shields Water Bill, Swansea Corporation Bill, Wrexham Gas Bill.

The Bolton Corporation Bill and the Bootle Corporation Bill have been referred to a Select Committee, consisting of Sir Joseph Leese (Chairman), Mr. Walford Green, Mr. Guest, and Mr. Ernest Gardner; to meet next Thursday.

The Croydon Rural District Council having withdrawn their petition against the Croydon Gas Bill, it was removed from the group of Bills referred to the Select Committee considering the London Gas Bills, who concluded their labours on Thursday.

UNOPPOSED BILLS.

Last Thursday the Committee of the House of Commons presided over by the Right Hon. A. F. JEFFREYS had before them further Unopposed Bills.

Epping Gas.

The preamble of this Bill recites that it is expedient that the limited liability Company should be dissolved and re-incorporated with further powers, and that the limits of supply should be defined. It further states that the demand for gas in the district has increased, and is increasing, and it is expedient that the Company should be empowered to improve and extend their works, to erect further gas-works and other buildings, and to raise additional capital for such purposes. This was borne out by evidence; and the Bill was ordered to be reported.

Higham and Hundred of Hoo Water.

This Bill states that, in view of the increased demand for water within the limits of supply of the Higham and Hundred of Hoo Water Company, it is expedient, for the purpose of extending their mains, pipes, and other works, that the Company should be authorized to raise further moneys. After formal evidence, the Bill was ordered to be reported.

Loughborough Corporation.

By this Bill it is sought to extend the time granted by the Loughborough Corporation Act, 1897, for the construction of water-works, to enable the Corporation to purchase further lands, and to borrow further moneys for their water-works. Formal evidence was given; and the Bill was ordered to be reported.

Seaham Gas.

This Bill seeks authority to incorporate and confer powers on the Seaham Gas and Lighting Company. Mr. Durnford (the Agent) said that, in order to meet the scruples of the Local Authority, they had made some modifications. They had, he showed by evidence, reduced the price from 3s. 8d. to 3s. 6d. per 1000 cubic feet; they had reduced their maximum dividend; and they had met the Local Authority in every way. The Bill was ordered to be reported.

Wrexham Gas.

Further powers are sought in this Bill to be conferred upon the Wrexham Gaslight Company, that they may raise additional capital for the purposes of their undertaking, and that they might extend their area of supply so as to include part of Gresford, and the parishes of Abenbury, Fawr, Bieston, Borras Hovah, Borras Riffre, Erlas, Gourton, and Marchwiel, all in the rural district of Wrexham, Denbigh. After the usual evidence, the Bill was ordered to be reported

THE METROPOLITAN GROUP OF GAS BILLS.

House of Commons Committee.—Monday, March 20.

(*Before Mr.* F. CAWLEY, *Chairman, Sir* WALTER PLUMMER, *Mr.* KENNETH BALFOUR, *and Mr.* MOONEY.)

THE LONDON (COUNTY COUNCIL) GAS BILL AND THE GASLIGHT AND COKE, SOUTH METROPOLITAN, AND COMMERCIAL GAS COMPANIES BILL.

Consideration was to-day resumed of the above Bills, which were taken together. The object of the London (County Council) Gas Bill is to amend the Acts relating to the supply of gas in the Metropolis, and to make further provisions with reference thereto. The Companies' Bill is to amend the Acts relating to the Gaslight and Coke, the South Metropolitan, and the Commercial Gas Companies with regard to the testing of gas, the procedure for forfeitures, and otherwise. The County Council petitioned against the Companies' Bill, and the Companies against the County Council Bill.

Sir RALPH LITTLER, K.C., Mr. FREEMAN, K.C., and Mr. TALBOT appeared for the London County Council. The Gas Companies were represented by Mr. BALFOUR BROWNE, K.C., Lord ROBERT CECIL, K.C., Mr. L. ROSTRON, and Mr. BERNARD WILKINSON.

THE ADJUSTMENT OF CLAUSES.

THE STANDARD PRICE.

Sir R. LITTLER said he was sorry they had not been able to arrange their differences; but he thought they would not occupy much of the time of the Committee. With regard to clause 8, which dealt with the alteration of the standard price, the report of the Departmental Committee was not in favour of the alteration. Well, the County Council were anxious to bring themselves within the terms of the report as far as possible, and in other respects they believed that they had entirely complied with it. Therefore he would ask them to strike clause 8 out of the Bill.

This was agreed to.

THE OFFICIAL TEST.

Sir R. LITTLER then reverted to clause 5, as to testing for calorific power, sulphur impurities, and illuminating power with flat-flame burners. He read from the report, and showed that the Departmental Committee recommended that official tests should continue to be made. The suggestion of the Committee was founded, apparently to a considerable extent, on the fact that, in the parallel case of water, similar tests, not involving forfeiture or penalty, had been of great advantage. Now, the County Council did not propose to impose anything upon the Companies, except what was in sub-section 4:—

> The Company shall provide and maintain at any testing-place such apparatus and materials as the Gas Referees may from time to time prescribe and certify for use for the purposes of this section, and shall give to any gas examiner access to any testing-place, and shall afford to him all facilities for the proper execution of his duty under this section.

He referred to the importance of the information furnished by these tests, and said that, with regard to calorific power, it would be most important that these observations should be made. There were very considerable expressions of opinion that the sulphur compounds were the cause of the rotting of leather and various other things of that kind. If this clause were adopted, all the necessary facts would be collected and tabulated by those who would be beyond suspicion; and the information would be very useful in the future. The only possible burden that would be placed upon the Companies was that contained in the sub-section he had read. He could call evidence on this point; but it seemed to him that it was hardly necessary to do so, and he should really like to know what objection his friend had.

Lord ROBERT CECIL said that perhaps it would save time if he just stated what attitude the Gas Companies desired to take up on this clause. They thought it a little hard that these tests, which were really for the advancement of scientific information, and nothing else, should be put upon them and carried out at their expense, and involving all the worry and trouble of such tests to the employees of the Gas Companies. At the same time, they did not desire to take up a *non possumus* attitude with regard to the clause. What they felt about it was that they would be quite willing to assent to it with, he thought, only two substantial alterations. In the first place, the clause provided that "Each gas examiner shall, at such times and places and in such manner as may be from time to time prescribed by the Gas Referees, make testings," &c. The Companies were quite confident that the greater number of these tests would turn out to be valueless; and therefore they would much rather leave it to the County Council to say at what times the tests should take place, because they believed that, after some experience of the tests, the Council would abandon them as useless. Therefore, they wished the clause to be so altered; and then, by a later clause, this would be left to the County Council and not to the Gas Referees. There was one other smaller point. One of the tests was "the illuminating power as ascertained by means of a flat-flame burner to be prescribed by the Gas Referees." The Companies were only anxious that it should not be prescribed once for all—because improvements might be effected—so that they would be saddled with a particular burner. They were agreed as to that, he understood. They accepted the rest of the clause; and then they proposed to put in, in order to carry out what they suggested in the earlier part, an extra sub-section. There had been a controversy between the Companies and the County Council as to whether testing for penalties should take place on Sundays. This was a controversy which he could well understand. In this clause, the tests were not for penalties at all; they were merely to collect scientific information in order to guide future Committees of Parliament, or be a guide as to the desirability of pursuing the sulphur test proposed in the Council's Bill. The Companies said that, for this purpose, there could be no reason for testing on Sundays. It was very hard for the people engaged; it involved a great deal of extra labour; and, therefore, as it was merely for the purposes of information, they proposed to exclude Sunday for these tests. They would have to discuss later on whether Sunday should be excluded for all tests. But that was quite a different point, for there it was a question of testing for penalties. When it was merely for the purpose of collecting information, there could be no objection to omitting Sunday from the days of tests. This was the whole point. They were quite prepared to say that any decision of the Committee on this matter should not in any way affect the discussion as to whether there should be no testing for penalties on Sundays.

Sir R. LITTLER asked the Committee not to decide until they had reached the main question.

Lord ROBERT CECIL said this question was not bound up with the penalty question.

The CHAIRMAN said the Committee had decided to postpone the whole of clause 5 for the time being.

SULPHURETTED HYDROGEN TEST.

Sir R. LITTLER then proceeded to clause 6, which reads:—

> The mode from time to time prescribed and certified by the Gas Referees for testing and recording the presence of sulphuretted hydrogen in gas supplied by the Company shall not be more stringent than the mode prescribed in Schedule A of the Gas-Works Clauses Act, 1871, and section 15 of the Act of 1880 shall apply accordingly.

Their clause followed very much the lines of the report of the Departmental Committee.

Lord ROBERT CECIL said that the proposal of the Gas Companies was that this test should be a quantitative test, as suggested by one of the witnesses before the Departmental Committee. They thought it was better than that proposed. So far as the actual amount was concerned, they would be prepared to have a more stringent test than that which the witness suggested, if necessary.

Sir R. LITTLER said that they did not wish to adopt the suggestion, because they wanted to follow the report of the Departmental Committee as nearly as possible.

Lord ROBERT CECIL: I should like the opinion of the Committee as to whether we could ask for this quantitative test.

The CHAIRMAN: I do not think so.

Lord ROBERT CECIL: Then, in that case, I think I prefer to accept the clause as it stands.

SULPHUR IMPURITIES.

Sir R. LITTLER then introduced clause 7, which deals with the suspension of liability to forfeiture for sulphur impurities other than sulphuretted hydrogen. He said that this clause was an advance on the report of the Departmental Committee. If it should turn out that the suspension of the sulphur tests in an enormous place like the County of London should be injurious to health, then representation would be made to the Board of Trade by the Gas Referees. What the County Council asked was that the sulphur tests should be in suspense, and be suspended for all time, until something better was found. They knew that there were such processes in course of being perfected and improved; but, in the face of what the Departmental Committee stated, they did not wish to press the continuation of penalty, and they would never ask for the re-enactment of them unless they found that there was some ground for them. But even then it would be on the responsibility of the Board of Trade.

Lord ROBERT CECIL said his friend had not called any evidence; and he did not accept the clause. It would be very bad for legislation to have a clause of this kind. It was really to substitute the Board of Trade for Parliament in a matter of the first importance.

Sir R. LITTLER said he was quite content to make it a provisional order.

Lord ROBERT CECIL asked what was the advantage of that. If the Gas Companies were content that there was such a satisfactory test, then it could be done by a clause in the General Powers Bill of the County Council for the year, without the slightest difficulty. If the Companies did not accept it, what was the good of having a provisional order? The Departmental Committee found distinctly that it was undesirable to continue the sulphur tests. The Companies were prepared with evidence to say that sulphur did no harm in gas. There were no such provisions in the country as to sulphur compounds. In the face of this, what was the advantage of keeping that in suspense over them, when it was a matter which would produce violent controversy? He asked the Committee not to make this new departure, but to leave them exactly as the Departmental Committee recommended, and to leave them free from a restriction which did not affect the vast majority of the gas undertakings of the country.

The CHAIRMAN: I think we shall abide by the recommendation of the Departmental Committee.

Sir R. LITTLER: Very well.

The CHAIRMAN: Then clause 7 goes out.

Sir R. LITTLER: No; clause 7 does not go out. But we shall have to amend it so as not to suspend it. We will amend it in accordance with the Committee's decision.

CONNECTING PIPES WITH TESTING-PLACES.

Sir R. LITTLER said they had agreed about clause 8. Then came clause 9, as to pipes connecting mains with testing-places. The Referees had complained that if there were connecting pipes, it would interfere and make impracticable their testing in some cases. The Departmental Committee endorsed the view of a Referee as to the proper method of testing; but they thought that it should be made compulsory instead of in the option of the Referees.

Lord ROBERT CECIL said he desired two alterations in the clause. He agreed that the Company should connect each testing-place with the main; but he did not think it was a convenient thing that it should be prescribed by the Gas Referees. It must really be left to the Gas

Company. Then, as to the service-pipe, they took a strong view that there ought always to be a tap which would turn it off from the main in case of fire and leakage. This was one of the securities of every gas supply. Of course, there always was in a private house a main tap which cut off the whole supply of the house. He did not know that the Gas Referees, in the first instance, and the London County Council in the second, had ever suggested that there was any possible injury that could arise to the public by the existence of this tap. They were prepared to put it inside the testing-place; so that all questions of tampering with it could be avoided. He thought this was a sensible thing, although it was quite true it was not actually in the wording of the report of the Departmental Committee.

Mr. TALBOT said it was important that it should be known exactly where the gas came from. Tests very often went on for a long time. If the tap was to be provided, it should be done in some similar way to that of fire alarms—there should be left evidence that the key had been used.

Sir GEORGE LIVESEY thought it was an insult. They had given an assurance some months ago to the Board of Trade that they would never use the tap except in case of emergency, and then notice should be given to the parties. But to lock it up, or put it into a glass case! There must be a certain amount of trust and confidence.

The Committee decided that the requirements of the County Council should be complied with.

SUNDAY TESTING.

Clause 11, as to Sunday testing, was next dealt with.

Mr. TALBOT said the Departmental Committee stated that the test should no longer be obligatory; but they did not say they should not be entitled to test. The County Council, of course, acquiesced entirely in the decision that they should not be bound to test; but they considered it was expedient in the public interest that they should be entitled to test, because there was no reason why the public should not get as good gas on Sundays as on other days. He thought the contention of the Companies was that not only should they not be bound to test, but that they should not be allowed to test.

Mr. BALFOUR BROWNE remarked that the Companies considered it should be abolished altogether, for these reasons: For 34 years there was no Sunday testing. It was quite true a section was introduced into the 1868 Act which made it obligatory. Evidence had been given that the Council never used to test on Sundays at all, and that the Council never wished to test on Sundays. If the Court decided they were bound to test, then they must test. Where was the necessity for it? They manufactured their gas, not on the Sunday, but on the Saturday, and kept it over the Sunday, and supplied it on the Sunday. The test could equally well be made on Saturday. Otherwise it involved a very considerable amount of Sunday labour; and, as the gas was exactly the same as the Saturday gas, he saw no reason why it should be even left optional. It was quite true he was departing from the report of the Departmental Committee; but he would suggest it would be far more convenient to abolish it altogether.

The CHAIRMAN: I do not think the Committee agree with you. They think it had better be left optional.

Mr. BALFOUR BROWNE: Now we can deal with clause 5.

The CHAIRMAN: The Committee are of opinion that we exclude Sunday in this case.

Mr. TALBOT said this would necessitate the addition of the Companies' sub-clause to the County Council's sub-clause, in order to put clause 5 right.

THE CHIEF GAS EXAMINER AND FORFEITURES.

The next contentious clause was 14, which dealt with further powers to the Chief Gas Examiner as to forfeitures.

Mr. TALBOT thought that this clause carried out exactly what the Departmental Committee suggested—that, where a Gas Examiner was able to specify that the fault was not substantial and due to careless conduct, the matter did not go to the Police Court at all. Then the clause went on to provide for the mode in which the forfeiture was to be recovered, and the way in which it was to be applied.

Mr. BALFOUR BROWNE said if the Committee would look at clause 21 of the Companies' Bill, they would see the difference of the two proposals at once. The only difference was that if it was unsubstantial, or not due to their fault, they gave the Gas Examiner power to deal with it; but if he came to the conclusion that it was substantial, it must go on to the Police Court. The Companies objected to this. Why? It was an unnecessary contumely for the Companies; and what they proposed to substitute was that they should be liable to the maximum penalty whether they went to the Police Court or not. If the Gas Examiner found that it was substantial, then they proposed that they should be liable to the full penalty. The Police Court could do no more than make them liable to the maximum penalty. It might be that they might say half the penalty; but he was willing to put himself under the maximum penalty. He did not know why his friend wanted to drag them to the Police Court.

Mr. TALBOT submitted that the Departmental Committee and the Bill had gone as far as they ought to go in the point of concession. In the case of large Companies like these, it was not the penalty that they cared about; it was the publicity.

The CHAIRMAN: The Committee agree that it shall stand as it is in the County Council Bill.

NON-COMPLIANCE WITH REFEREES' PRESCRIPTIONS.

Clause 16, as to penalty for neglect to comply with prescriptions of the Gas Referees, was the next dealt with.

Mr. TALBOT said the mischief which the clause was designed to remedy was this: At present there was no prescription of the Gas Referees or any legal prescription of the kind mentioned in this clause which could be enforced except by leave of the Attorney-General. He believed there was an action still pending which was commenced in 1900; and this was the mode by which any of the requirements could be enforced. There should be a simpler method of dealing with the matter; and they should be entitled to proceed summarily in respect of any breach of any of these requirements. He did not think that there could be anything oppressive in this to the Companies, because if they looked at clause 10, they would see that they had provided the Companies with a relief for this by way of appeal against any certificate of the Referees which they thought unreasonable. The Board of Trade were at present the people who had to take action; and there was no question, he thought, that they considered that the present mode was exceedingly cumbersome and unsatisfactory. He submitted that their proposal would be to the advantage of all parties; but they were quite prepared to insert, if it was wished, the provision that any proceedings within the section should not be taken except with the consent of the Board of Trade.

Mr. BALFOUR BROWNE said this was a new departure from the report of the Departmental Committee; and he thought it would work most unjustly and harshly on the Companies. They could "run him in" for a penalty of £50; and surely it was unfair and improper. They objected to the clause altogether. They did not see any necessity for it. At present they could go before the Board of Trade and complain about the Companies. The clause was bad, because it was too vague. He did not think it was fair, and he would ask them not to give it.

The CHAIRMAN: I think we will leave our decision on this clause until we come to deal with clause 4.

NO ALTERATION IN THE TERM "DAY."

Mr. BALFOUR BROWNE said that a clause abolishing the Sunday test would be brought up for the Committee's approval. Now, on clause 5 of his Bill, he had one little matter. The term "day," as at present understood, went from 9 a.m. on one day to 9 a.m. on the next day. Therefore, it got into Sunday. He wanted "day" to mean from midnight to midnight.

Sir R. LITTLER said as it had worked satisfactorily all these years, he did not see why it should be altered.

Mr. *Thomas Goulden*, the Chief Engineer to the Gaslight and Coke Company, spoke as to the difficulty of a nine to nine day, as compared with a twelve to twelve day.

Mr. *Howard*, a Gas Examiner, was called by the London County Council to show how inconveniently the change would apply to the Referees.

The Committee decided to make no alteration.

Tuesday, March 21.

SOUTH METROPOLITAN GAS BILL.

This is a Bill to provide for the retirement of the Gas Referees, to empower the Company to purchase land, and for other purposes.

Mr. BALFOUR BROWNE, K.C., Lord ROBERT CECIL, K.C., and Mr. ROSTRON appeared for the Company; Mr. A. M. WHITE, for the Camberwell Borough Council; and Mr. FREEMAN, K.C., and Mr. COURTHOPE MUNROE, for the London County Council.

THE PROPOSED ABOLITION OF THE REFEREES.

OPENING FOR THE COMPANY.

Lord ROBERT CECIL said that the only part which he proposed to trouble the Committee with in opening was Part II., which began at clause 5. Shortly, it provided for the abolition of the Gas Referees and the standardization of the existing tests. As to the provisions for standardization, they must depend upon the decision come to by the Committee on the London Gas Bill. They did not propose to ask the Committee to make any modification in the tests, but to take them as they were and make them permanently applicable to the Metropolitan Gas Companies, in the same way that all gas tests were for Provincial Gas Companies. The part of the Bill which would cause the greatest amount of discussion was the abolition of the Referees. There was only one clause which bore upon the matter—viz., clause 29 of the City of London Gas Act, 1868, which provided for the appointment of the Referees.

> The Board of Trade shall, as soon as may be after the passing of this Act, appoint three competent and impartial persons, one at least of them having a practical knowledge and experience in the manufacture and supply of gas, who shall be called the Gas Referees, who are in this Act referred to as the Gas Referees; and in case of a vacancy occurring among them by death, resignation, or otherwise, shall appoint a competent and impartial person to fill the vacancy, one at least of the three being always qualified as aforesaid.

The reason for this provision was that in 1868 there were a considerable number of questions as to which there was doubt and dispute between those who represented the public (the Local Authorities) on the one side and the Companies on the other; and the idea was that the Referees should be appointed to settle these questions. They were appointed as impartial arbiters between the two parties; and in order to secure that they should not be unfair to the Companies, it was specifically provided that one of them at least should have practical knowledge and experience in the manufacture and supply of gas. The questions which then had to be determined were, in the first place, what kind of burner should be used for testing gas. This was disposed of by the adoption of Sugg's "London" argand No. 1 burner. The next question was where the testing-places should be, and what should be the nature of their equipment. This also had been disposed of. Testing-places had been provided, and had been equipped very elaborately and at considerable expense to the Companies. Then as to the question as to how much ammonia should be allowed in the gas, he believed a mistake had been made by the Referees at first. They provided a test of a very severe character, which they subsequently modified; and now it was a test as to which no dispute arose at all. Then there was the question of how much sulphur other than sulphuretted hydrogen ought to be allowed in the gas. Both as to the ammonia and as to the sulphur it was a matter of discretion for the Referees whether they should impose any, and, if so, what, tests upon the Companies; and in the matter of sulphur, they provided a very

severe test restricting the sulphur compounds other than sulphuretted hydrogen to 17 grains. This test endured until it was abolished by the present Committee on the previous day, in accordance with the recommendation of the Departmental Committee. The other matter which had to be settled by the Referees was the question of sulphuretted hydrogen; and there again they took a very strict view of their duties, and provided a test which was admitted by everybody to be a great deal too stringent for the purpose in view, which was to provide a wholesome gas. This also had been modified by the present Committee, in accordance with the report of the Departmental Committee. The net result was that of the five questions they had to determine, two had been standardized for all time—the burner and the testing-places; and the ammonia was also in that category. In the case of the other two—the sulphur compounds and the sulphuretted hydrogen—they did, in fact, standardize the amount of impurity which should be admitted in the gas; but they had been found to be wrong, and their decision had been reversed. He wished to impress upon the Committee that the sole reason of their appointment was that they were to be impartial arbiters between the Companies and the public, and not unduly to take the side of one or the other. They were not to be, as one had described himself, policemen to look after the Companies; this duty was left to the Local Authorities. He did not think it would be disputed that since 1872—during the last 33 years—none of the three Referees had had any practical acquaintance with the manufacture of gas. They were eminent men; but they were not gas engineers or gas managers, or anything of that kind. Mr. Vernon Harcourt was a distinguished Professor of Chemistry, Dr. Haldane was a Professor of Physiology, and Mr. Boys was an Engineer, but not in any sense a Gas Engineer, or having a special knowledge of gas manufacture. Therefore for the last 33 years this provision of the Act had not been complied with; and, as the Companies thought, the result had been very unfortunate for the manufacture of gas.

Scientific Tests that are Out of Place.

Instead of practical men, acquainted with commercial necessities and commercial difficulties in regard to gas making, they had had a purely scientific tribunal to test the gas; and the result had been the elaboration of a series of scientific tests which might be in place if the object were chemical research, but were quite out of place when the object was merely to secure the public against injury by the supply of poisonous gas, or gas that was unduly below the illuminating power fixed by Parliament. One of the Companies' chief complaints had been that there had been perpetual variations, so that they never knew from year to year what particular test they might be compelled to undergo in the next year. This had been not only a matter of expense, but of great harassment and anxiety to those who had to supply the gas; and it had discouraged them from entering upon untried improvements in manufacture, because they did not know but what the tests they might have to submit to in the following year might make any expenditure in the nature of improvement wholly thrown away. The Referees prepared a notification every year, which they furnished to the Companies, stating the tests which the gas would have to undergo in the ensuing twelve months. He would ask the Committee to look at the last one—for the year 1904—because they would see that his remarks about the unduly pedantic character of the test were fully borne out. There was the test which the Referees had devised for sulphur compounds—a matter which the Departmental Committee had decided was quite unnecessary. It extended over two pages, and provided for an exceedingly elaborate apparatus with all sorts of instruments. Next, the Committee would see what he suggested was "science gone mad" in respect of testing a commercial product. There was a most elaborate formula; and then there was this provision: When the aerorthometer reading is between ·955 and ·965, ·966 and ·975, ·976 and ·985, and ·986 and ·995, diminish the number of grains of sulphur by 4, 3, 2, and 1 per cent. respectively. Let the Committee consider what this was devised to meet. There were some 40 grains of sulphur in 100 cubic feet of the gas. It was common ground that the number of grains could not be diminished below about 17 per 100 cubic feet, whatever test was applied; and yet they had this elaborate provision. Surely, this was pedantry. It could not have mattered a straw to anybody whether there was 1, 2, 3, or 4 grains more. The right thing to do was to fix such a number as could certainly be excluded by proper purification, whether the temperature of the air was a little more or a little less. In Appendix A to the notification, the testing lamp—the pentane lamp—was elaborately described; and in Appendix B, there were full directions for manufacturing pentane. He should tell the Committee that pentane was absolutely useless for any other purpose than for gas testing. It was made solely to be used in Mr. Harcourt's 10-candle power pentane lamp, for the purpose of testing London gas. There they had elaborate means of preparing this special compound, and all sorts of precautions to avoid a little more of one hydrocarbon and a little less of another. The public wanted to know generally that they had a gas of good illuminating power; but they did not require this elaboration of the tenth of a candle, more or less. He thought all these criticisms were perfectly justified, because the Referees were imposed in 1868 on London as a kind of experiment.

No Referees in the Provinces.

The idea was that, if it answered, the system was to be extended to the whole country; but not a single company outside London had had the provision of Gas Referees extended to them. It was said that London had an enormous supply, and therefore there must be special provision; but, after all, the supply of the three Companies was not larger than some of the great Provincial Companies—such as Liverpool, where no disadvantage had ever been felt from the absence of Referees. The same might be said with every gas undertaking in the country. On the Continent, there was even a greater supply; but there was not this elaborate testing. There was a rough test to ensure that a commercial article was being supplied; and the rest was left, as he submitted it ought to be left, to the working of the ordinary laws of supply and demand as controlled and tested by competition. The whole point was that in 1868 the Companies had really a monopoly of lighting in London; there was nobody to compete with them at all. Now there were the mineral oils, which were fierce competitors, especially with the poorer classes; while the electric light was a strong rival in the way of more luxurious lighting. Therefore there was the greatest possible inducement for the Companies to make a good gas; and the necessity for the elaboration and perpetual changing of the tests, if it ever existed, had gone. He submitted that these restrictions on a great industrial manufacture were a very serious public evil. He was not going into questions of a larger character; it was enough for him to say that, in regard to gas manufacture, what was wanted was the encouragement of enterprise and development, and to see whether something could not be done to meet the growing requirements of cheap gas for heating power. They wanted in every way to encourage people to advance in the gas industry, as in all other industries; and to have these elaborate scientific experiments on their manufacture really served no public purpose. It was merely the result of a false apprehension of Parliament in 1868, followed by the impossibility of carrying out the plan with completeness.

Perpetual Friction.

The result was that there had been perpetual friction between the Referees and the Companies. This was not to be wondered at, because the Referees had a scientific ideal and the Companies a commercial ideal; and the body which was appointed to be an imperial arbiter had come to be regarded as the great enemy of the Companies. This might not be altogether the fault of the Referees—he did not care to go into that question—but when they found such a condition of affairs, he submitted that it was time for Parliament to interpose, and say: "We have tried this plan, and it has not answered." Perhaps this was because they could not find the right man to do it—they were not able to obtain a really practical man as one of the Referees. But whatever the reason, it was not necessary. It created friction, without giving any security to the public; and therefore now was the time to abolish it. It was said there were one or two changes introduced by the Departmental Committee which had still to be worked out, as, for instance, the calorific test. This was answered by clause 12 of the Bill, the effect of which was that if, in the judgment of the Board of Trade, it was necessary to have further experiments of the kind, then these experiments should be made by the Chief Gas Examiner. The position of the Chief Gas Examiner had been altered by the report of the Departmental Committee. In old days, he merely acted as a kind of Appeal Court in certain cases of penalties; but now he was allowed to say whether any particular prescription of the Referees was reasonable—in other words, he had become really the final Gas Referee. In order to work out the changes recommended by the Departmental Committee, the Companies were quite content to take the Chief Gas Examiner; they would rather have a single person than the body of three Referees in whom they had unfortunately lost all confidence. For the rest, they would take the tests of the Referees as amended by the London Gas Bill, which was before the Committee on the previous day. Let them be standardized, as the tests all over the country were. If the unlikely happened, and it turned out that the tests were not sufficient for the public, there were the London County Council—very vigilant guardians of the public interest, who had not shown themselves a prey to favouritism of the Companies. He might add that the other great similar undertakings—viz., the electric lighting companies—were under no such harassing restrictions, and had no elaborate tests perpetually being devised.

Sir Walter Plummer asked if the Companies had no remedy against the non-compliance with the clause of the Act which required at least one of the Referees to have practical knowledge and experience of gas manufacture and supply.

Lord Robert Cecil said he thought not. The only conceivable remedy would be an application for a mandamus against the Board of Trade. But it would be practically impossible to go to the Courts and say that the Board of Trade had not done their duty. If the Board of Trade said they had done their best, he did not think any Court would grant a mandamus in such a case; and he certainly should not advise the Companies to make the application.

A Preliminary Objection and the Committee's Opinion.

Mr. Freeman pointed out that the proposition was entirely inconsistent with the Bill which was passed on the previous day. In the London Gas Bill there were various provisions which clearly recognized the continuance of the Referees as an existing body. In the interests of time, it might shorten the matter if he took a preliminary objection to the Bill. The Bill passed yesterday exactly carried out recommendations (*f*), (*g*), and (*h*), of the Departmental Committee; and yet this Bill provided that the Referees should be abolished for all time. If needed, he could call evidence to show the necessity for their existence.

Lord Robert Cecil said there was no real inconsistency, because provision was made by clause 12. As to the merits, he would ask the Committee to hear evidence.

The Committee-room was cleared. On the re-admission of Counsel and parties,

The Chairman said: Unless you have witnesses, Lord Robert, who go a great deal farther than your opening remarks seemed to intimate, the Committee are of opinion that they cannot entertain the question of the abolition of the Referees.

Lord Robert Cecil said he would like Sir George Livesey to explain his views.

The Chairman: Very well.

Sir George Livesey, Examined by Lord Robert Cecil.

Lord Robert Cecil: The main object of this Bill is the abolition of the Gas Referees?

Witness: That is so.

Will you explain to the Committee why you think they have become unnecessary in the public interests?—Shortly put, their work is done; and there is no further use for them. If the question should be raised that the last Bill before the Committee necessitates some work to be done by them, we should be perfectly willing to let a clause be inserted in this Bill to say that the Referees should be continued for twelve

months, to prescribe any methods of testing which may be necessary, because we do not want to get to loggerheads with the Board of Trade. We ask, really, for the consideration of this Bill and the abolition of the Referees for the sake of peace. There will be no peace as long as they remain. We have protested to the Board of Trade from time to time against their not complying with the condition in the Act that one of the Referees shall have practical knowledge and experience in the manufacture and supply of gas. It is the fact that since 1872 that has not been complied with.

The CHAIRMAN: Your objection is against having Referees at all. We do not want to hear objections against their composition.

Witness: We want to know where we are. The Referees were appointed to define certain things. They were to define the burner and the manner of testing, and the method with regard to sulphur. They did so, and that is inserted in the Act. They prescribed the method of testing for sulphuretted hydrogen, which is unduly and improperly severe. Then they prescribed the sulphur test. At that time the Act required them to consider how far sulphur compounds could exist without creating a nuisance in the neighbourhood. But they imposed conditions ignoring this requirement. What we say is that everything necessary can be put into an Act; and the need for the Referees does not then exist.

What do they do now?—For a great many years they have done nothing at all. They simply re-issue their instructions once a year. I do not think there has been any change the last five or six years.

Your objection is that they formulate instructions which are very difficult to carry out?—I say they have caused infinite worry to the gas managers. A very large portion of their time has been taken up in efforts to meet the absurdly stringent requirement with regard to sulphuretted hydrogen.

Is there not some way of getting an Act, some way by which you can appeal to them for another method?—For years the Companies have been repeating this; and at last, after a great many years, Mr. Vernon Harcourt told the Departmental Committee that the restriction about sulphuretted hydrogen was too severe. I saw him myself last summer; and I said: "With regard to this absurd restriction about sulphuretted hydrogen, you know the worry it has been to us, and you have known it for years. Why did not you say that before instead of waiting until it came before a Departmental Committee?" Mr. Harcourt replied: "Our duty was to carry out the Act; and our position was that of a policeman." This was not very complimentary to the people he spoke of, because policemen are to look after thieves. I do not suppose he meant that.

They look after property as well?—They are to be "three competent and impartial persons;" and it is their duty to look after the interests of the Companies just as much as those of the public. But their policy for a great many years has been to consider the public rather than the Companies; and in doing so, they have done harm to the public. They have greatly retarded reductions in the price of gas; they have hampered us with absurd and unnecessary restrictions; and they have diverted the attention of our Engineers from work which was absolutely necessary and much more important, and thus have increased the cost of gas. The management of a gas company is not a simple matter. There are a lot of things which have to be attended to; and we ought not to have our time and attention taken up by the imposition of these absurd restrictions. They have no commercial, no industrial, and no gas experience. We say that such a great industry ought to be free from these restrictions.

But they do not want to harass you in regard to manufacture?—With regard to sulphuretted hydrogen, they devised a test which necessitated the greatest watchfulness on the part of the Companies; and even then there were traces which no one could account for.

The CHAIRMAN: Really, your objection is that they formulate these regulations; and you think they are too stringent.

Lord ROBERT CECIL: May I say we have inspectors as well. There is given to this body a kind of sub-statutory power of imposing new regulations upon us without the control of anybody at all, though it is true that in the Bill which was last before the Committee you have given an appeal to the Chief Gas Examiner.

Witness: We want to know where we are; and we say that what is sufficient for all the rest of the kingdom is good enough for London. Everything can be stated in a few clauses in an Act; and then there is nothing for the Referees to do.

Lord ROBERT CECIL: Is there any ground for saying that the consumers of gas in the rest of the country have suffered from the want of Referees?

Witness: Certainly not, nor from the want of testing. The testing all over the country is a farce. There is no test where I live. It is a non-statutory company, and they supply what gas they please. There is no restriction as to illuminating power, purity, or pressure; and this is the case in hundreds of places.

Have you ever heard it suggested by anybody that the consumers of gas are worse off in the country than they are in London?—Not at all. At the time the Referees were appointed, it was felt that a Parliamentary Committee could not define the burner and determine the quantity of sulphur; and therefore the Referees were appointed to do so. But their work was done long ago.

You say that if they had looked at it from a competent and impartial point of view, they would have arrived years ago at the conclusion which the Departmental Committee arrived at last year—that these tests were not required?—Yes. I do not know that I care very much about the Referees, except as regards what they may do in the future. We have got relief from the most onerous condition that they imposed; but I say that they might impose other onerous conditions. I do not know what they will do in the future; and therefore I say let us stay as we are.

The CHAIRMAN: Your method of manufacture might alter in the future; and then the Referees would be very useful.

Witness: Then we appeal to Cæsar—to Parliament.

Supposing you made gas in some different way, or tried to get a substitute for lime, would not the Referees be of some use?—No.

Lord ROBERT CECIL: Have you made provision for any exceptional case of this kind by clause 12?

Witness: Yes; and the County Council have done the same. They make the Chief Gas Examiner the arbiter in case of difference with the Referees; and therefore we say, if there is to be a chief arbiter, why not do away with the intermediate Referees. [To the Chairman.] With regard to your question about a new method of making gas, Sir, these Referees will never find any improved method of purifying gas, because they know nothing about it; and if there should be a new method, it is for Parliament to deal with it. But while the Referees are here, they hinder us from making experiments. We dare not conduct experiments, for fear of violating their absurd restrictions. We want more freedom, to do our best. Let me say that we want to do the best for the public, as well as for ourselves. We are partners.

The CHAIRMAN: In other words, experiment with the public.

Witness: We want to experiment for the public advantage.

Mr. KENNETH BALFOUR: The Examiners were appointed by the Act of 1876, whereas the Referees were appointed under the Act of 1868?

Witness: Gas Examiners were appointed first under the Act of 1868.

When the Act of 1876 came up, was there any attempt then to get rid of the Referees?—No; they had only been recently appointed.

The CHAIRMAN: Was not this question before the Departmental Committee?

Witness: They did not feel that it was within the scope of their inquiry.

Mr. MOONEY: You did not take any objection before the Departmental Committee as to the constitution of the Referees?

Witness: Yes; the objection was raised about no practical man being appointed. Mr. Trewby, for the Gaslight and Coke Company, said it; and I think I said it.

CROSS-EXAMINED BY MR. COURTHOPE-MUNROE.

Mr. COURTHOPE-MUNROE: Your objection to the Referees is one of rather long standing, is it not?

Witness: Yes.

It is distinctly a grievance?—I had sole charge of the Company for a good many years; and I know the worry it was.

Am I right in saying that in 1902 a Bill was brought before Parliament, and you then sought to get rid of the Referees?—Yes.

Notwithstanding that, when the Bill was brought in, we heard all we have heard to-day, and a little more, the result was the Committee declined to do it?—Yes. You see they die rather hard.

The Chairman of that Committee said this: "The Committee have decided in this matter to strike out the clauses of the Bill dealing with the abolition of the Gas Referees." You admit, whether the Referees know anything about gas or not, that the Departmental Committee who sat to deal with these matters were a body of experts?—Well; there was one gas man on it.

Whether you asked that Committee to recommend the abolition of the Referees or not, I find no less than twelve closely printed pages of evidence are devoted to Sir George Livesey's views; and I think you certainly had a go for the Referees?—I forget what I said. I stated that they were not a competent body, and there was not one of them who complied with the Act. I have told this Committee that.

Your antipathy was clearly before the Departmental Committee?—Yes; but only in that sense.

Notwithstanding your evidence, the report stated: "Except as may be involved in the foregoing recommendations, the powers and duties of the Referees shall remain as at present"?—None of us asked for the abolition of the Referees.

The London Gas Bill gives you an appeal to the Chief Gas Examiner in every case?—Yes.

Then how are you hurt by the Referees?—Then I say, What is the good of them? We have all the trouble of it and the waste of time.

Is not that an argument for abolishing all Courts of First Instance?—I should not say so. I do not see that it is necessary to have two people to decide the same thing.

RE-EXAMINED BY LORD ROBERT CECIL.

Did you ever hear of a great commercial undertaking which was carried on subject to the decision of a Court of First Instance and subsequently an appeal to the Court of Appeal, or even the House of Lords?

Witness: No.

Mr. MOONEY: After the practical man went off, did the Companies object to the appointment which was made by the then Board of Trade?

Witness: The Board of Trade put in an engineer who had had some experience of gas distribution. We did not wish to quarrel with the Board, and made no objection. That has been my policy ever since. I have had dealings with the Board for thirty years, with four Secretaries; and there has never been the slightest misunderstanding or hitch of any kind. It is because we do not want to quarrel with the Board that we have asked what we have.

Did you object to the Board going outside the Act by appointing a scientific man in place of a practical man?—Not at that time; but we have since.

Have you told them they do not comply with the Act?—No. I have a letter here which I myself took to Sir Courtenay Boyle; and he said: "I should not like to take that letter." It was a strong protest against the non-appointment of an engineer. I said: "Very well; I will take it away." I may say this for the Board—that I believe they have experienced extreme difficulty in finding and selecting a gas man. They wanted to get one absolutely impartial; and all gas men are committed, one way or the other. I do not think the Board have found it at all easy to comply with the condition.

The CHAIRMAN: Whatever the composition of the Referees, you object to them?

Witness: I say they do more harm than good.

THE COMMITTEE'S DECISION.

After a short pause,

The CHAIRMAN said: The Committee agree that we cannot entertain the question of the abolition of the Gas Referees.

Part II. was therefore struck out of the Bill.

OTHER PROVISIONS OF THE BILL.

THE PURCHASE OF LAND.

Lord ROBERT CECIL remarked that the next point was the acquisition of lands, dealt with in clauses 13 and 14. They were the ordinary provisions.

Mr. WHITE said that, as to the rates, a point arose out of a decision of the Court of Appeal, where it was decided that those who took land were liable to make good to the local authority the poor-rate. The poor-rate did not include the general district rate. The result was that, when land was cleared, the local authority found it was non-productive for as long as the purchaser chose. In the present case, it might be said it was only a small space; but the principle was a very serious one. It was so serious that the case was fought out in the Court of Appeal, because in Islington the School Board cleared a very large area and left the land vacant for a long time. They held that the School Board were only liable to pay the poor-rate, and not that which was now known as the poor-rate, which was a very different thing. He asked the Committee to insert a clause making the Company liable for the whole rates to the Local Authority.

The CHAIRMAN: The Court refused the very point you want us to decide?

Mr. WHITE: No; they said that it could only be dealt with by legislation.

Lord ROBERT CECIL: This proposed clause has never been put into a Private Bill except by agreement; and I am told it was refused a few days ago by Sir Henry Kimber's Committee.

The CHAIRMAN: The Committee cannot agree to the clause proposed by the Camberwell Borough Council.

EXEMPTING ENGINES, FITTINGS, &c., FROM DISTRESS.

Lord ROBERT CECIL said that there was no dispute on clause 15, exempting from liability to landlord's distress for rent all gas engines, fittings, &c., let on hire, nor on clause 16, dealing with the period of error in defective meters. Clause 17 provided that all gas engines, apparatus, fittings, and appliances let by the Company on hire, should, notwithstanding that they were fixed to any part of the premises, continue to be the property of the Company, provided that they should bear a metal plate or mark indicating the Company as the owners. The promoters agreed to meet the Camberwell Borough Council on one point by adding the proviso: "Nothing in this section shall affect the amount of rating of any premises on which such gas apparatus shall be fixed." The other point raised was that the Council desired the engines to be made liable for distress for rates due from the occupier. At present, they were not liable; they were part of the fixtures of the building, and it was only personal property which was liable. The promoters proposed to make them no longer fixtures, but to remain the property of the Company. The provision asked by the Camberwell Council would be most unjust.

The CHAIRMAN: The law does not allow the local authorities to distrain on anything which is on the hire system, does it? For instance, a piano?

Lord ROBERT CECIL thought it did. At any rate, it was a question of the exact terms on which the piano was there. But, of course, they would not be allowed to distrain on machinery under any circumstances, because it would be part of the freehold. It was the property of the Gas Company until the occupier had paid the full price.

Mr. WHITE said Lord Robert Cecil wanted to get it both ways. He wanted to take his gas-engine and treat it as no longer a part of the freehold, but put it into the category of ordinary chattels, and then to take it out of the liability which chattels were under. This was unfair. It was admitted that the fact that it was there made the premises of higher rateable value; they had to pay more rates than the hereditament next door because of the machinery in which the tenant had a vested right, and he submitted the rates ought to be chargeable upon the very chattel which increased the value.

The CHAIRMAN: Take a gas-engine to make soda water, upon which is a plate saying it is the property of the Company. Is that seizable for the rates?

Mr. WHITE: I should say that was a tenant's fixture, in which case it would be. If it is not, then it would not be seizable.

Lord ROBERT CECIL said their point was that if it became part of the freehold, and the freehold was mortgaged, the gas-engine would pass into the freehold and be taken away from the Company. But they did not propose to alter the law of distress at all. What his learned friend wanted was to get an advantage which he had not now, and which he would not have under the general law.

The CHAIRMAN said the Committee would like to know whether, in the case of its being attached to the freehold, it could be seized by the mortgagee, though it had a plate saying it belonged to the Company.

Lord ROBERT CECIL said that was so; and the clause was to get rid of this. That was the whole point. It was merely to get rid of the legal effect of bolting the engine on to the floor.

Mr. WHITE said he objected to the whole of clause 17, because it altered the law.

Lord ROBERT CECIL said it only applied to things let on hire; and one could not let a thing on hire unless it remained one's property.

The CHAIRMAN: The Committee have decided to pass the clause, with the addition offered by Lord Robert Cecil.

Lord ROBERT CECIL said there was no other opposition to the Bill.

At a later stage, the clauses were adjusted; and the Bill as amended was ordered to be reported to the House.

LONDON GAS BILL.

THE POSITION OF WEST HAM.

Mr. EDWARD MORTEN (for the West Ham Corporation) said that he had not interposed in the proceedings, because his only application was one for uniformity. They were quite content to take in West Ham any provisions with regard to the testing of the gas which might be applied to London. The position was this: The Commercial Gas Company and the Gaslight and Coke Company both supplied gas within the borough of West Ham; and there had always been some difficulty in getting a similarity of tests within the borough and outside it. His application to the Committee was that West Ham might have the tests made by the same apparatus and by the same method as was provided for the rest of the Company's area. This could be done by a very simple clause. It was covered by the notices for the Bill.

Mr. FREEMAN said if it were covered by the notices, he had not the slightest objection.

The CHAIRMAN: Very well.

THE COMMITTEE SUGGEST AN AVERAGE OF THREE DAYS' TESTS.

The CHAIRMAN: We have considered clause 4; and we have a suggestion to make—viz., that the clause shall be as embodied in the Bill; but the test shall be the average of three consecutive days. That is, the test shall be for three days before the Company can be penalized.

Mr. FREEMAN said he was not raising any objection, but would point out that at present three tests at intervals of not less than an hour had to be taken; and if the average came under the standard, a fourth test had to be made. So that on the three days' test, nine, and possibly twelve, tests would have to be made.

The CHAIRMAN: You have no objection to that?

Mr. FREEMAN: I am advised there is no practical objection to the suggestion.

Mr. WILKINSON said all the Companies were ready to accept the Committee's suggestion.

The CHAIRMAN: Very well. There will be a three days' test.

NON-COMPLIANCE WITH REFEREES' PRESCRIPTIONS.

Mr. FREEMAN said a clause would be brought up. The only other thing outstanding was clause 16, which the promoters had amended as follows:—

If the Company neglect or refuse to comply with any prescriptions or certificate of the Gas Referees, against which the Company have not appealed to the Chief Gas Examiner as hereinbefore provided, or neglect or refuse to comply with any prescription or certificate returned or varied by the Chief Gas Examiner, or to provide and maintain any testing-place, apparatus, or materials, or any other matters or things, the Company shall be liable on summary conviction to a penalty not exceeding £50 for each day.

And so on as in the Bill. One thing had been pointed out, which he thought was reasonable; and he was prepared to add:

Provided that no proceedings under this section shall be taken except with the consent of the Board of Trade, after giving the Companies an opportunity of being heard thereon.

Mr. WILKINSON submitted that words should be added to show that the Companies should not be liable to any penalty until a month had elapsed.

The CHAIRMAN: I think you can come to an agreement upon that.

Mr. FREEMAN: If you will let us bring up this Bill again to-morrow morning, we shall probably have settled every point.

The CHAIRMAN: Very well.

Wednesday, March 22.

LONDON GAS BILL.

THE THREE DAYS' TEST—PREAMBLE PROVED.

Mr. FREEMAN said that everything was now agreed.

Mr. WILKINSON remarked that on the previous day he had accepted the three days' test; but in order to safeguard his position, he might say that he must not be taken to have accepted the principle of clause 4 with regard to the tests.

Mr. FREEMAN protested against this attitude. The Chairman had made the suggestion; and in the interests of peace, he had said he was content if that settled the whole matter. He had carried it out loyally in his Bill. His friend had said he accepted it; and he did not think it was fair now to state that he did not accept the principle.

The CHAIRMAN: We thought it the best compromise; and I think we must say we consider the preamble of the Bill proved.

The clauses were then adjusted; and the Chairman was ordered to report the Bill, as amended, to the House.

GASLIGHT AND COKE, SOUTH METROPOLITAN, AND COMMERCIAL COMPANIES' BILL.

PREAMBLE NOT PROVED.

The CHAIRMAN: The preamble of this Bill is not proved.

SOUTH SUBURBAN GAS BILL.

This is a Bill to alter the provisions of the Acts relating to the South Suburban Gas Company with respect to the illuminating power of the gas supplied by them, the testing of gas, and for other purposes.

Mr. BALFOUR BROWNE, K.C., Lord ROBERT CECIL, K.C., and Mr. L. ROSTRON appeared for the Company; Mr. FREEMAN, K.C., Mr. COURTHOPE-MUNROE, and Mr. ADKIN, for the London County Council; Mr. VESEY KNOX and Mr. A. M. PADDON, for the Borough Councils of Beckenham, Lambeth, Penge, Camberwell, and Lewisham.

PROPOSED REDUCTION OF ILLUMINATING POWER.

Lord ROBERT CECIL said the Company was of a suburban character; about half the district being within the County of London. The Bill was one of considerable importance. The main objects were to reduce the illuminating power the Company were bound to supply, and to abolish the sulphur testing. It was proposed to settle the method in which the testing for illuminating power should take place, in connection with its reduction. When he came to this part of the Bill, he would explain in what respects a distinction could be drawn between the present Bill and those already discussed. The proposal was to reduce the illuminating power from 15 to 13 candles. Up to 1860, there were no provisions with regard to illuminating power; and from

1860 to 1900, Parliament prescribed for companies all over the country the illuminating power at which gas should be supplied. Then followed a third period, which began with the South Metropolitan Bill of 1900. This period they were still in; and he hoped they were just commencing the reduction of the illuminating power. In the earliest stages of gas supply, there was a richer coal available, which had now become exhausted. In addition, there was a species called cannel coal, which supplied gas of a very high illuminating power indeed. The process was to mix the gas derived from the cannel with that derived from the ordinary coal. The ordinary coal would not produce more than 13 or 14 candle power gas without some enrichment; and when the previous sources of supply failed, engineers had to devise some kind of enrichment for the gas. The system which had been adopted most generally was carburetted water gas; but this was open to certain objections. In the first place, it was expensive; and what was mainly wanted now was a cheap gas. Then, again, some forms of enrichment were not permanent. When sent along a large number of mains, there was a tendency for the enrichment to deposit on the sides of the pipes, taking with it some of the other illuminating portions of the coal gas; so that when it arrived at the burner there was a liability of the gas being even poorer than if it had been sent out as a pure coal gas. How far this applied to water-gas enrichment, was a matter of dispute. Then there was at present the tendency to increase the use of gas for power and heat at the expense of its employment for illumination; and in power and heat he included the incandescent system, because there, of course, the value of the gas depended upon its heating the mantle. The use of the incandescent system had grown very rapidly in the last year or two. For a long time its growth had been impeded by certain difficulties; but now mantles were cheap, and in the case of the South Metropolitan Company 75 per cent. of the light consumers used them. In places on the Continent, the growth had been even more rapid. He was told that in Berlin the other day they wanted a flat-flame burner; and they searched the city, but could only find one, which was burning in the Gas Company's offices. Then gas was being increasingly used for heating purposes; and there was some extension of its employment for engines. What was required, therefore, was a cheap gas of high calorific power. Enrichment, particularly by water gas, added little or nothing to the heating value of the gas; and so for all those purposes enrichment by the water-gas method was absolutely valueless. There was no advantage, except when gas was consumed in a flat-flame burner. Carburetted water gas did not give so much heat or so much power as ordinary 13 or 14 candle power coal gas. The incandescent burners were mainly made in Germany; and in Germany they burnt a very low-power gas—about 12 candles. The burners were sold in England, and used with a 15-candle gas; and less heat was derived from this than from the 13 or 12 candle gas. In the case of the South Suburban Company, 52 per cent. of the gas was used for heating purposes; and of the remaining 48 per cent., which was utilized for lighting purposes, 22 per cent. was consumed with incandescent mantles. Therefore 74 per cent. of all the gas burnt was used for either heat or power, and not more than 26 per cent. in flat-flame burners.

The Free Supply of Burners.

Then, by clause 5 of the Bill, the Company bound themselves, if required by any consumer, to supply to him and fix free of charge, instead of the flat-flame burners then in use, flat-flame burners adapted for producing the best and most economical light obtainable from gas of the illuminating power prescribed by the Act; and notice of the provisions of this section would be given with each demand note of the Company sent out. This would extend over two years after the passing of the Act. It was found by experiment that the great mass of flat-flame burners were not adapted to produce the best light. In point of fact, consumers did not really care whether they got 12, 13, 14, or 15 candle power. They bought any burner which happened to be sold; and instead of getting 15-candle power, which was supplied to them, they burnt at such a rate that they only got 10, 8, or even less candle power.

The Chairman: What is the object of limiting the supply to two years?

Lord Robert Cecil said he would consider with the Chairman and the Engineer whether it would be desirable to make some change in this limit. The idea was that they would put all the consumers into a thoroughly good position, and then they would keep up their own renewals. Continuing, the learned Counsel said he had a list of a large number of cases in which the illuminating power of gas had been reduced. In 1902, there were three instances; in 1903, five; and others in 1904. Referring to the report of the Departmental Committee, he said that body was appointed to deal with the three London Companies and not with the Provincial Companies as a whole; and therefore he trusted the Committee would not feel that the report was binding upon them in the same way as they considered it in regard to the London Gas Bill. The whole question really was whether the theoretical disadvantage which would be suffered by those who used flat-flame burners was sufficient to outweigh the undoubted advantage which would accrue to all other consumers.

The Mode of Testing.

This was all he wished to say with regard to the reduction of the illuminating power from 15 to 13 candles; but the question arose how the 13-candle gas was to be tested. By 13-candle gas, they meant gas tested in a certain way. There were elaborate provisions in clause 2. But they would be quite prepared to take the proposal which they made in the last Bill—viz., that the gas should be burnt at the proportionate rate of 5 cubic feet an hour—and to say that the gas should be tested in such a way that, if burnt in a No. 1 argand burner at 6·4 cubic feet an hour, it would give 16 candles; the point being that burnt at 5 cubic feet an hour under similar conditions, it would give a 13-candle gas. The lowest which was before the Departmental Committee was a 14-candle gas; and whatever might be said as to the merits of the test recommended by the Committee for this, all the objections which were felt to testing in that way were greatly enhanced when dealing with a lower power gas. If it were right to call what they described as a 14-candle gas a 13-candle gas, they would have to call the gas the South Suburban Company proposed to supply something like 10 or 11 candle gas; and any variation would be proportionately exaggerated. He desired to point out to the Committee that an important letter, written by the Institution of Gas Engineers to Mr. Gerald Balfour, the late President of the Board of Trade, was published the previous day in the "Journal of Gas Lighting."* [The letter was read.]

Mr. Paddon asked if any official of the Institution would be called for cross-examination.

Lord Robert Cecil said that Mr. Irving, the President, would be called. They would also ask the Committee to hear Professor Lewes.

The Question of the Standard Price.

Continuing, the learned Counsel said that one other matter he ought to mention was the question of reduction of the standard price. There was no provision for this in the Bill; but the Engineer and the Chairman of the Company had considered the question, and they were prepared to offer a reduction of 2d. Under the sliding-scale as it existed at present, the consumers of the South Suburban Company got the benefit of eight-ninths of any reduction in the cost of manufacture which was made; and the remaining one-ninth went to the shareholders. They maintained that this was really a perfectly fair way of dealing with any improved manufacture; but in order to disarm the opposition of the Local Authorities, they were prepared to say that the whole of the saving effected by the reduction of illuminating power should go into the pockets of the consumers.

Sir George Livesey, Examined by Mr. Rostron.

Mr. Rostron: You are Chairman of this Company?

Witness: Yes.

The Chairman: May I ask how many Companies you are Chairman of?

Witness: Only two. They are quite enough.

Mr. Rostron: The present illuminating power is 15 candles, tested by the standard burner at the 16-candle power rate?

Witness: Yes.

You propose to reduce your illuminating power to 13 candles tested in the same burner at the same rate?—Yes.

Is the main object of the reduction to supply a pure coal gas?—Yes. I introduced a similar Bill in 1903; and the House of Commons Committee gave us all we asked for. In the House of Lords it was objected that the Board of Trade were going to appoint a Departmental Committee to consider these things, and therefore the matter must be postponed. In 1904, we again introduced a Bill; and then we were told the Departmental Committee were sitting, and we ought to wait till their report was issued.

Mr. Freeman: The Parliamentary Committee expressly said that, having heard the evidence, they rejected the Bill on its merits.

Mr. Rostron: I was in it; and my memory agrees with Sir George's.

Witness: At any rate, it was rejected by the Lords; and in 1904 we again introduced the Bill. The Local Authorities moved the Board of Trade to stop it. We now re-introduce it.

Mr. Rostron: My question is whether your primary object was to supply a pure coal gas?

Witness: Why we introduced this Bill was because we found it impracticable to supply a 15-candle gas with the available supply of coal. The only available supply is from Newcastle; and we found this coal will not give gas of 15 candles. The quality of gas should be that which can be obtained from the available supply of coal. To make a 15-candle gas we have to enrich. There are three methods. The old plan was by means of cannel, which produced a rich gas; and the uniform mixture obtained was quite satisfactory. The next was by means of petroleum spirit; but we found this was not satisfactory. Then came carburetted water gas. The Company put up a plant which cost £30,000; but we have been obliged to abandon it. We are now using petroleum spirit, which does no good. We convinced the Committee in 1900 that whatever we spend on this enrichment is wasted for any other than flat-flame burners. We had to abolish the use of lime because it was a nuisance. Since we did away with water gas and lime we have had no complaints of nuisance at all.

What proportion of gas which you supply is used for heating, cooking, and power?—I made a calculation independently, and I could not arrive at less than 72 per cent. for heating, cooking, and for use in incandescent mantles. Then we let a large number of cooking-stoves on hire, and a good many consumers have their own. We hire out a comparatively small number of gas-fires; the great majority are owned by the consumers. The balance of the gas which is unaccounted for is partly used in flat-flame burners, partly in cooking-stoves, partly in fires owned by the consumers, partly in other appliances, and then there is the waste. The number of gas-fires must be enormous, because when we have bright, cold weather the consumption of gas goes up tremendously.

For those purposes heat is important?—Yes. For all of them a 13-candle unmixed coal gas is better than the 15-candle mixed gas. It is not better than the mixed coal gas and cannel; but then the consumers have to pay the extra 2d. per 1000 cubic feet.

In this case the consumers will get the benefit of the reduction in price which you will be able to make?—Yes; and they will be better off, because they will have a perfectly uniform gas. I am not here to say anything against water gas; but what I do say is that what the consumer wants is a gas of uniform quality. If it is coal gas, we know what it is. The objection to carburetted water gas is that the mixture is always variable; it may be 10 per cent. to-day and 30 per cent. to-morrow. If it were a uniform 20 or 25 per cent. of carburetted water gas, then the burners could be adapted to use it; but this cannot be done when the percentage varies.

The Chairman: Why does it vary so much?

Witness: One of the great arguments for the use of water gas is that is enables companies to deal with the irregularities of the supply. For instance, as the weather gets warmer or colder there is a variation at

* See "Journal" for March 21, p. 760.

once, all the year round, in the amount of consumption. In the winter, the variation is much greater. If there is an increased demand, with coal gas you have always to be prepared with a large quantity in reserve in the holders; and to get extra retorts in working order takes perhaps three days. The water-gas plant, on the other hand, can be set to work in half-an-hour, if there is an increased demand; and this is of great advantage. Then, again, very few men are required. The two Companies of which I am Chairman have no trouble whatever with regard to men. All of them are shareholders.

Mr. ROSTRON: As regards the flat-flame consumers, does the reduction in illuminating power affect them?

Witness: In 1900 it was put before the Committee that, if the South Metropolitan Company were allowed to reduce the quality of their gas by two candles, it would necessitate an increased consumption of at least 30 per cent. to the consumer. This has not taken place. It is the universal experience that, where gas has been reduced in quality, there is no increase in the consumption.

I think you found in the South Metropolitan district that the flat-flame consumers' burners did not develop the full illuminating power of the gas?—We offered in our Bill of 1900 to change all the flat-flame burners which the consumers might require for two years, and to announce it every quarter. This period expired two years ago; but we make the announcement still. We found that the burners we took down, when we were supplying 16-candle gas, on the average did not give 10 candles; and many of them not more than 6 or 7 candles. The County Council themselves testified that our burner was the best that had yet been introduced for burning a 14-candle gas. The result is that the consumers obtain more light than they did with the old burners, though the quality of the gas is lower.

In point of fact, the flat-flame consumers have not lost, and will not lose, anything in this case by the reduction?—No; we want to serve the consumers in such a way that they shall be satisfied.

Now as to the amount of saving you expect to get by the abolition of enrichment?—The methods of enrichment are petroleum spirit, which costs about ½d. per candle, and carburetted water gas, which comes to less than ¼d. per candle.

You expect to save by this just under 1d.?—That is what I say; but there are people who contend that water gas is cheaper than coal gas. Not only will the consumer get eight-ninths of the reduction, but we make sure that he gets all by reducing the standard price. We propose to lower the standard price from 2s. 10d. to 2s. 8d. per 1000 cubic feet. The result will be that not until the price goes down to 2s. 2d. per 1000 cubic feet will the shareholders receive the same dividend as that to which they are now entitled.

The CHAIRMAN: What is your present selling price?

Witness: 2s. 5d. per 1000 cubic feet. If the price goes up to 3s. 2d., we should only get £4 6s. 8d., instead of £5; if to 2s. 10d., we get £5 in both cases. We give a discount to consumers burning over a certain amount, and a reduction to public authorities and railway companies; but it is never more than 5 per cent. It is 5 per cent. to those who pay us over £1000 a year, 4 per cent. for £500, and 3 per cent. for £100. But ours is not a district in which there is much manufacturing.

Mr. ROSTRON: How does your selling price compare with other companies?

Witness: We happen to have the lowest initial price and nearly the lowest selling price of all the Suburban Companies. We are the only one having a neutral zone. The initial price is simply the regulator of the dividend; it does not regulate the selling price. It is 2s. 10d. per 1000 cubic feet; and the selling price is 2s. 5d. Our standard dividend is 5 per cent. We paid 5⅛ per cent. last year; and we were entitled to pay 5⅝. Everyone says that our proposal is a fair one; but they want us to accept the Departmental Committee's method of testing.

As you can only save 1d. by this reduction of the illuminating power, you will not make any money out of this Bill?—Certainly not.

AN OFFER BY THE OPPOSITION.

Mr. FREEMAN thought it would save time if he stated shortly what the position was. There were three elements in the proposition which Sir George Livesey was now putting before the Committee—reduction of power, method of testing, and alteration of price. The point to which he attached by far the greatest importance was that of the testing of the gas. Though technically Sir George was perfectly entitled to bring forward his proposition in the Bill, because his Company were outside the Metropolis, yet as a matter of common sense he suggested they ought to have the same method of testing as in the preceding Bills.

The CHAIRMAN: Independently of the tests, are you opposing the reduction of the power of the gas?

Mr. FREEMAN: I say at once, perfectly frankly, that if the gas was tested in the same way as it has been ordered to be tested in other cases, I would accept the 13-candle power, with a proper reduction of price.

Mr. PADDON said he was on all-fours with regard to the other Authorities; but, of course, a very great deal turned upon what was the proper reduction of price.

Mr. FREEMAN said he would go further. If the gas was tested in the same way as had been ordered in other Bills, as a settlement of the whole question he would accept 13 candles and the 2d. reduction in the standard price.

The CHAIRMAN: Supposing the Committee should decide to allow you to reduce the power of the gas to 13 candles, and at the same time impose upon you the test which they have imposed upon the other Companies, are you prepared to accept it?

Witness: I do not like it. I will tell you at once that we cannot. It is impossible. It would mean the description of our gas as 10-candle power.

It comes to this, that unless the Committee will alter the tests, you prefer not to have the Bill?—We shall prefer not to have this part; and we shall withdraw it. We must have the sulphur part. We cannot go on using lime; and we cannot reduce the sulphur compounds. I want to put this point. The Companies say that the system of testing recommended by the Departmental Committee is wrong; the London County Council say it is right. Now, I say that the evidence on both sides is based on experiments conducted almost entirely for that purpose. Our experience is that it is never safe to make any serious alteration on experiments only. It must be tried on a working scale; and the suggestion which I make is this: Let both systems of testing be tried for twelve months. Let the gas be tested as now prescribed, and let it be tested at the 5 feet an hour rate for this Company's gas and for the other Companies; and if at the end of twelve months the Companies' contention should be shown to be wrong, an agreed clause could be inserted in one of the Bills of the London County Council. What we object to is that we should be exposed to penalties on this new method of testing. Let the penalties run on the old system; and every time the gas is tested on that system, let it also be tested on the new system, and see what is the result.

Supposing we stick to the test we have already ordered, what is to hinder you having tests made on this system, and then bringing up a Bill next year when you will be able to show the results of doing so?—If you will say that the penalties are to be on the old system, and the new system for experiments only, I will agree; but I cannot accept it for penalties.

If the Committee think that the mode of testing they have already passed in the other Bills is that which ought to be put into this Bill, you are not prepared to go on with this portion?—No; I cannot do that.

Sir WALTER PLUMMER: How far is your district within the area of the County Council?

Witness: We supply half the borough of Lewisham; the other half is supplied by the South Metropolitan. Part of the borough of Lewisham is in the London County Council's area. We supply Beckenham, which is entirely outside the County Council, as is also Penge and part of Croydon; and we supply small parts of Lambeth and Camberwell which are within the area of the County Council.

Mr. FREEMAN: It is as nearly as possible half-and-half.

Witness: No. It is not one-sixth of the whole. I do not think it is one-eighth.

The CHAIRMAN: We do not want to hear all the evidence we have had before. We had Mr. Dibdin's diagram; and I think the Committee understand his contention that the ratio of loss would be greater as the candle power goes down. I think we should have Dr. Clowes to tell us what his objection is. It would shorten the matter.

DR. CLOWES, EXAMINED BY MR. FREEMAN.

Witness said he was aware of the proposal of the Bill to reduce the candle power to 13, and also of the suggested method of testing. If this method were applied, it would give a very much lower power gas than 13; it would be something between 10 and 10½ candles. The proposed reduction of 2d. on the standard price would not represent a fair equivalent. The mode of testing prescribed in the previous Bill would be quite fair for the 13-candle gas.

The CHAIRMAN: Do you say it would be a fair test for a 13-candle gas.

Witness: Undoubtedly the greater value of the gas would be found by the Company's method of testing, because they would call it 13-candle, instead of about 10 or 10½ candle gas.

By Mr. FREEMAN: The observations he had made in respect of the proposals of the Companies in the other Bills applied to the present Bill in a somewhat increased degree. He saw no good in Sir George Livesey's proposal that there should be two methods of testing—one for the purpose of penalization, and one for the purpose of information—because the object was simply to give a nominal value to the gas; and they did not care what the nominal value was. It was clearly right to adopt the same method of testing as had been prescribed for the three London Companies, because this was a Metropolitan Company as to part of their area.

CROSS-EXAMINED BY MR. BALFOUR BROWNE.

Mr. BALFOUR BROWNE: We have settled the gas we are going to supply at 13-candle power tested by our method. Tested by the method of 5 feet an hour, this will not only come out much below 13 candles, but it will also vary from time to time, will it not?

Witness: I do not know that it would vary.

Do you believe in the experiments made by Mr. Dibdin and the other gentlemen which have shown variations?—I cannot say. My experience as a Gas Examiner is that the gas in London is very uniform in illuminating power.

Have you ever tested by this 5 feet an hour method?—We always have done so for the Gaslight and Coke Company.

That is a 16-candle gas, and is admitted to be fair; but is it a fair way to test a 13-candle gas if you want to give the best quality to the gas?—Not if you wish to give the best quality with a large consumption. Of course, we dissent altogether from the large consumption.

If I am to test a gas of 16 candle power by supplying at 5 feet an hour, I ought to test a 13-candle gas by supplying at 6 feet odd an hour?—I think that is grossly misleading to the consumers, because the consumers understand they are having a certain amount o fgas; and I think this should be supplied, and there should be a standard, just as you sell milk at so much per pint.

Does not the consumer try to get the quantity of gas which will give him the best light?—I think not.

Does he not turn the gas up or down as it flares or flickers?—You do not change the pressure of the gas. He will be burning at the same pressure whether it is 16, 13, or 12 candle power.

Apart from what has been done by the Departmental Committee, as a scientific man, I ask you which is the right way to test the gas?—The right way is the uniform way we now adopt. The consumer has nothing at all to do with the rate of consumption.

Mr. KENNETH BALFOUR: Have the London County Council got a provision of this kind in any other Suburban Gas Bill as to the 5-feet rate?—I think the question was not raised before.

In answer to Sir Walter Plummer, Mr. BALFOUR BROWNE said that one-sixth of the consumption of gas supplied by the Company was within London, and five-sixths outside.

The CHAIRMAN: Say a consumer has a standard burner, and he wants the most light he can get for 5s. What is the best test you can give?

Witness: If it were put upon that basis, we should see no difficulty. Our difficulty lies in this—that the Companies who are using their test say they are supplying a 14-candle gas; but they conceal the fact, which the consumer does not appreciate, that he is burning one-sixth more gas in order to obtain it. In my own house we had the illuminating power considerably reduced without warning; and I noticed my flame became less. The burner does not pass the extra gas, and cannot, to give the extra illuminating power I wish to get.

I want to know whether the 5-feet test will tell a consumer that he is getting 5s. worth of illuminating power for 5s. ?—No; it does not do that. We tell him by our statutory test approximately what illuminating power he is getting with his ordinary burner. He burns practically a constant quantity of gas, whether it is poor or rich. Of course, if it is a rich gas, he gets very much more light. Therefore, if he burns at the standard rate, we say we should test at that standard rate.

Do you not consider it would be a greater hardship on the Company to have the 5-feet test with a 13-candle gas than with the South Metropolitan Company ?—There would be a greater difference; but I do not think the difference is a real one.

It would not be a greater hardship ?—I do not think so.

Mr. W. J. A. Butterfield, Examined by Mr. Paddon.

Witness, who was called on behalf of the Local Authorities, stated that he had had some years' experience in the practical manufacture of gas at Beckton, with the Gaslight and Coke Company. He was also Secretary to the Gas Referees, though he did not appear in that capacity. If the 5-feet rate were established, with regard to the present Bill, any variations in the value of the gas shown would be nearly *pro rata* to the variation in the value of gas as burnt in the flat-flame burner by the consumer. The light obtainable by the flat flame was proportional to the illuminating power of the gas tested by the method the Committee had adopted in the case of the London Gas Bill. It was therefore a perfectly fair test.

Cross-Examined by Mr. Balfour Browne.

Mr. Balfour Browne: Supposing I get a 13·2-candle gas, do you say when that is tested by the 5 feet an hour rate it will always give an exactly proportionate result ?

Witness: It would vary with the description of the coal with which the gas was made.

Therefore it is not a proportionate reduction ?—The 13-candle gas tested by the 5 feet an hour method would give a proportional reduction in a flat-flame burner, proportional to the candle power of another gas tested by the same method.

I have two gases at 13·2 candles. Presumably, burnt in the same burner, they would give the same light to the consumer ?—If the 13·2-candle gas were burnt by the 5-feet method, it would.

It is a 13·2-candle gas in both cases. I test it at the 5 feet an hour, and one of the gases gives 10·1 and the other gives 11 candles; and yet the gas in the consumers' burners is exactly the same ?—I think not. The method of testing by the "London" argand burner at the 5-feet rate indicates the supply which the consumer will get from the flat-flame burner; the other does not.

With the 13-candle gas, you would have to define the gas which was to be given at 10 candles, would you not ?—Yes.

Are you certain that it is always 10 candles by that method ?—Oh, no; there is not a constant difference.

You said it varied with the different kinds of coal ?—The difference between the two would vary with the different kinds of coal.

Though it is a 13·2-candle gas, if it were made with one coal, it would give 10 candles, and if with another it would give another candle power ?—Yes.

Is that fair, when the light is the same ?—Similarly, a 13-candle gas, tested by the 5-feet method, would give different values to what it would if it were tested by the other system.

Scientifically, you ought to have a different burner for every gas ?—In order to get the maximum value from the gas, yes.

Re-Examined by Mr. Paddon.

Mr. Paddon: Though when you are using the 5-feet rate it is not intrinsically the same as that given by the same gas in a flat-flame burner, it indicates proportionately exactly the same changes which take place in the flat-flame burner ?

Witness: That is so.

Therefore it is a perfect standard to the consumer of what he is burning in the flat-flame burner ?—Yes.

The Views of the Committee.

After the luncheon adjournment, the parties were not admitted into the Committee-room for some time. On their admission,

Mr. Rostron said: We have not given any evidence at all yet. I wish to call Mr. Irving, to prove the memorial that was published in the "Journal of Gas Lighting."

The Chairman: I do not think that is necessary.

Mr. Rostron said he wished to call Professor Lewes, and also to recall Sir George Livesey.

Mr. Freeman: I understood that now you are going to tell us your views, Sir.

The Chairman: Unless you have some different evidence, and fresh evidence, to that given in the cases already before us, the Committee are of opinion that they should not alter the test. We shall be glad to hear from Sir George Livesey, or any witness from your side, as to whether, under these circumstances, you are prepared to go on with this part of your Bill. We do not want to stop you; but it will be hearing evidence all over again, and, of course, there will have to be witnesses on the other side. We know exactly what your contention is in regard to testing. Have you anything further to put before us, different to what we have heard ? We will admit, for the sake of argument, that the value decreases very much.

Mr. Rostron: I have a few questions I should like to put to Sir George Livesey.

Sir G. Livesey, Recalled, and Examined by Mr. Rostron.

Witness said that he proposed to supply a particular gas to the consumers which, when tested by the standard burner, would give a result of 13 candles; and however it was tested, it would remain the same. The gas ranged between 13 and 14 candles. The question of the way the gas was to be tested was entirely different from whether the illuminating power was to be reduced or not. The only question was how the burner ought to be used. The consumer never tried to adjust it to the 5-feet rate, because he could not. Nobody could. He turned it up to get the best result. The flat-flame burners supplied to the South Metropolitan consumers were not limited to 5 feet an hour. There was nothing in the consumers' burners to prevent them from turning them up and down.

Are you prepared to accept this reduction of illuminating power with the 5-feet rate ? Will you tell the Committee your difficulties ?—My main difficulty is that, from my point of view, and the point of view of the whole of the gas industry, that method of burning the gas is wrong; and if I accept it for the South Suburban Company, it would be taken as a precedent which would damage the gas industry. What we want is to instruct our consumers to burn gas in the best way. If a system of testing is adopted which is not the best, it would hinder us.

The Chairman: It does not matter to you ?

Witness: Personally, no; but my reputation is bound up with that of the gas industry, and I should not like to do anything which would be considered against companies all over the country.

Mr. Rostron: What would your gas show according to the 5 feet an hour test ?

Witness: All the experiments indicate that it would have to be called 10-candle power.

The Chairman: Would you like it to be known that your gas was 10-candle power and the Gaslight and Coke Company's was 16-candle power.

Witness: I should rather like it, because it would show the whole absurdity of the gas testing. We want consumers to use incandescent mantles. It goes against us at first, because it reduces the consumption nearly 40 per cent.; but it enables us to meet the competition of the electric light.

Mr. Rostron: If it is fair for the South Metropolitan Company to call the 14-candle gas 13-candle, it is only fair to give you a similar reduction from 13 to 10 candle power.

Witness: It is the same thing. This shows the utter absurdity of the proposal of the Departmental Committee. They said that gas of all qualities should be tested burning at a uniform rate of 5 feet. The Departmental Committee of the Board of Trade in 1895 said exactly the reverse. They said the 5-feet rate ought to be abandoned, and gas burnt as it is now; and that Committee had far more experts upon it than the last one.

Professor Vivian B. Lewes, Examined by Mr. Rostron.

Mr. Rostron: You have heard it suggested that the proper way to test 13-candle gas would be to burn it in the standard burner at the rate of 5 feet an hour ?

Witness: Yes. It is a method which merely shows the remnant of illuminating power which is not destroyed by the over-aëration which takes place in the burner. The point which I should particularly like to draw attention to is the recommendation of the Board of Trade Departmental Committee of 1895, of which I was the Secretary. Nearly the whole of the members were expert photometrists, who thoroughly understood the question of burners and the method of burning gas. Their recommendation is given in the last Departmental Committee's report—that a fixed rate of flow should be changed to a varied rate of flow, as the former destroyed the gas by over-aëration directly it got below 16-candle power. There is a very much wider side to this testing question than has arisen, and that is the effect which it has on what I may call Imperial photometry, as compared with mere local bickering between local authorities and gas authorities. At the present moment, the lighting of the big cities is becoming almost a science; and unless one has a uniform and reasonable method of expressing illuminating value, that subject is rendered an extremely difficult one, and advances which otherwise might take place are prevented. Abroad, at the present time, you have the units of light perfectly well understood; and when one hears that certain lighting effects are obtained in a certain city with a certain value of gas, in whatever local terms they may be expressed, one can always readily translate them back to the English unit, and reason from that the lines one might adopt in obtaining results of the same character. But if the method which is now suggested be adopted for all qualities of gas, you at once lose that power, because the power which you then get as the candles per 5 cubic feet of gas burnt is simply the remnant of illumination left over after by far the larger part of it has been destroyed by using it in a burner unfitted for its consumption at that rate. If the test of 5 cubic feet per hour were applied to the 13-candle gas, the result would vary with some kinds of gas from less than 9-candle power to nearly 11-candle power with others; but the average of them would be 10 candles as nearly as possible. Normal coal gases would be just about 10-candle power; so that according to the Departmental Committee's report it would have to be called 10 candles.

Withdrawal of the Illuminating Power Clauses.

The Chairman said he understood that Sir George Livesey had decided to withdraw this portion of the Bill if the Committee imposed upon him the test settled for the London Companies.

Mr. Rostron said that if the Committee would make an allowance in the name which was to be applied to the gas, then he would call evidence to show the Committee what this allowance should be; and he thought Sir George Livesey would like an opportunity of considering it.

Mr. Balfour Browne said the Committee would remember that they had said in the other case that the gas, though of 14-candle power, should be called 13-candle if tested in that manner. The promoters said that, if tested in this way, the 13-candle gas should be called 10-candle.

Mr. Freeman said if that were so, it would only be reasonable that the price should be reduced by 5d.

Mr. BALFOUR BROWNE: No; it is still the same gas.

The CHAIRMAN: The Committee do not wish to impose something worse upon the promoters than they did upon the London Companies; but as to whether it should be called 11 or 10 candle gas, or what it should be, I express no opinion.

Mr. BALFOUR BROWNE: That is the exact matter which can only be determined by evidence; and it is upon this point I should like to call some experts before you to say what the 13-candle gas, tested at the 5 feet an hour rate, would give. If it is 10 candles, it should be fixed in the Bill.

The CHAIRMAN: Suppose we said, for the sake of argument, that we will allow the gas to be reduced, would it be possible for the Company to come to some agreement with the opponents?

Mr. VESEY KNOX: I think I ought to say, on behalf of the Local Authorities, that our position is that we absolutely object to the Company getting the Bill at all. Having regard to their deliberate breach of the law and absolute defiance of the Local Authorities, we object to their obtaining any relief. At the same time, we are not prepared to carry the opposition so far if the proposal were to put them on the lines on which you have put the South Metropolitan Company by the last Bill. But there would be no possibility of any sort of agreement with the Local Authorities.

Mr. FREEMAN said he adhered to what he had already said. He was content, in order to conclude the question altogether between the Gas Company and themselves, to accept the 13 candles, if judged by his test, and he agreed to the 2d. reduction, though he did not think it was sufficient.

Mr. BALFOUR BROWNE said the 13-candle gas they desired to have was 13-candle gas tested by the Company's method. If tested by the other method, some reduction must be made, as was done in the other case.

The CHAIRMAN: The Committee remember that they did give to the South Metropolitan Company one candle. Supposing we grant the reduction of the standard, it seems to me it would not be a difficult matter for the two opposing parties to say that as 13 is to 14, so is something to 12.

Mr. BALFOUR BROWNE said it did not necessarily follow that it was a rule-of-three sum; but if the Committee agreed to the principle, he was sure that Professor Clowes and a chemist on the Company's side could agree what would be a fair figure to put. He was willing to leave it to two gentlemen in this way.

Mr. FREEMAN pointed out that the real difficulty was that the Company's Bill proposed to reduce the gas 2 candles. If what they were now asking was carried out, they would get a reduction of 4½ candles.

Mr. BALFOUR BROWNE: Oh, no!

Mr. FREEMAN said the Company's obligation at present was to supply a 15-candle gas. Now they said they wanted to bring it down to 13 candles. Let it be really 13, but do not let it go down to 10½ candles. If they wanted it to be 13, and that could only be got by calling it 1 candle lower than it was fixed at, let them be relieved from the 15 candles, and let it be 14-candle gas, called 13-candle. Then he would be content to take 1d.

The CHAIRMAN: We want to relieve the Company if we can; but we cannot go entirely against what we did yesterday.

Mr. BALFOUR BROWNE said he was not asking the Committee to do that. He was asking them to say that the 13-candle gas was the right gas to supply, and that the Company should make the reduction they proposed. Their offer was 13-candle gas and the 2d., measured in the Company's way. The Committee had said: "No; let it be measured in accordance with the Departmental Committee's recommendation." The 14-candle gas, measured in this particular way, only gave 13 candles; therefore the Committee put 13 candles. The 13-candle gas measured in this way gave another figure—he did not know what it was, but Professor Clowes had said 10½ candles. Let them take the 10½-candle power; and then the Committee were treating the present Company exactly as they did the other three Companies. If the Committee came to this conclusion, surely it would be possible to agree that the face-value of the gas should be regarded as 10, 10½, or 11 candles.

Mr. FREEMAN said they could not possibly discuss this at all, because they could never be parties to a reduction of 4½ candles.

The CHAIRMAN: I suppose you admit that, assuming we decide to let the Company have the 13 candles, it would be fair to say they should only supply 12—just as the 14 candles and the 13 candles?

Mr. FREEMAN: No. I am advised that this is not so. We shall have to fight the whole thing.

After some discussion upon an objection by Mr. VESEY KNOX, that there was now no definite proposal before the Committee,

The CHAIRMAN said: The Committee would not go so far as to say that under no circumstances should the gas be reduced; but the promoters should put some definite proposal before us. If you say, Sir George, that you would accept the same conditions as the South Metropolitan Company, and accept 1-candle lower—that is, 12 for 13 candles, as you previously accepted 13 for 14 candles—then we could put that before the other side.

Sir GEORGE LIVESEY: I could not accept that. Professor Clowes has already said it would show 10½ candles. I withdraw all the clauses about the reduction of illuminating power. I will come here again next year.

Thursday, March 23.

THE SULPHUR CLAUSE.

Lord ROBERT CECIL said that clause 4—the sulphur clause—proposed to repeal section 17 of the Act of 1873, except the part which related to the manufacture of gas and residual products, and section 28 of the Act of 1893. The effect would be to abolish the sulphur restrictions. In the manufacture of gas, the inflammable part came over with certain things, such as ammonia, sulphuretted hydrogen, and other sulphur compounds, which consisted of a variety of things, and amounted to about 30 or 40 grains per 100 cubic feet. They could not all be taken out; but a certain portion could by lime purification. If the lime were used, one only got rid of a certain portion of the sulphur; and this portion really did no harm in the gas at all. That was proved not only by experiments, which, if necessary, he could put before the Committee, but also by the fact that in the vast majority of gas supplies all over the country there were no such restrictions, and no harm resulted. The use of lime also was injurious to the health of those engaged in the process, and constituted a very considerable nuisance. It had been the subject of proceedings against the Company. The Departmental Committee had considered the question very carefully, and reported that there was no sufficient reason for maintaining the restrictions. They said: "After careful consideration of the evidence on this question, the Committee are of opinion that the requirement that the sulphur impurities shall be removed to such an extent as to demand the use of lime, should be discontinued; and, in view of the fact that no effective substitute for lime has been found, they abstain from suggesting the imposition of any modified restriction in place of that now existing." In the London Gas Bill, the present Committee had abolished the sulphur restrictions, and did not put any terms upon the great London Companies in connection with the abolition.

SIR GEORGE LIVESEY RECALLED.

Mr. FREEMAN said the County Council were desirous that the sulphur tests should be preserved; but the Committee had given their decision on the point in the London Gas Bill, and it would not be at all respectful for him to ask that the question should be re-opened—there being no new facts to be brought forward. But the County Council desired to safeguard their position. Sir George Livesey, in withdrawing the portion of the Bill dealing with the reduction of the illuminating power, had intimated that on some future occasion it might be necessary for him to re-introduce the proposal. If Sir George did re-introduce a Bill dealing with the matter hereafter, the County Council would be in no way precluded from again raising the important question of the purification tests; but for the purposes of the present Bill, he accepted the Committee's ruling. He could not accept the actual form of the clause, because, quite unintentionally, as the Bill now stood it did a great deal more than it purported to do. Section 17 of the Act of 1873, which was proposed to be repealed, was the section which prescribed the burner and 5 cubic feet of gas per hour, and the chimney, and all the rest of the materials to be used in the test.

Witness: We did not mean that.

Mr. FREEMAN said he knew it; and he only pointed it out in order that it might be altered. It was right, of course, as the Bill originally stood; but now it would have to be modified. Probably what would be satisfactory would be that the same form as that in the London Gas Bill should be accepted—that was, that there should be no test involving penalties, but that tests should be made for observation and information, which could not do harm to anybody. Lord Robert Cecil relied upon the report of the Departmental Committee as the justification for the abolition of the sulphur tests; and this report further said there should be these tests for the purpose of information. If he were consistent, therefore, his learned friend would accept his suggestion.

Lord ROBERT CECIL pointed out that the Departmental Committee said they desired to collect a mass of statistics for the purpose of information, so that their successors might have material for seeing how the plan had worked in London. Though they thought that Committee had gone rather too far in this respect, he could understand that this might be desirable; but it could not be necessary to carry on these tests for information all over the country. One set of experiments was as good as another. To have them in the Crystal Palace district as well as in London seemed to him ridiculous.

The CHAIRMAN: The Committee think the London tests are quite sufficient, without imposing them upon this Company.

Mr. PADDON said the Borough Councils he represented were willing to withdraw their opposition to the change in the law with regard to sulphur compounds, in deference to the decision of the Committee on the London Gas Bill, on condition that the Company gave a parliamentary pledge to observe the law in respect of illuminating power. The Lewisham Council must not be prejudiced in the pending appeal to Quarter Sessions with regard to this matter; and the Council reserved their right in any future Bill to reduce the illuminating power to lay before Parliament the facts relating to the abolition of the lime process.

Witness: The appeal is not on illuminating power, but on sulphur only.

Mr. PADDON: Yes. That shall be made clear. I understood you withdraw the proposals for the reduction of illuminating power?—Yes.

That of course will carry with it the question of appeal so far as it relates to illuminating power only in clause 4?—We never intended to include that.

We are to remain *in statu quo* as to illuminating power until you come again next year?—Yes.

Lord ROBERT CECIL said he understood the Committee had passed clause 4, subject to the amendment Mr. Freeman had very properly suggested.

The CHAIRMAN: Yes.

Lord ROBERT CECIL remarked that the clause would be drafted by the Agents.

Mr. PADDON said the Company had indicated their intention of breaking the law right and left, without any regard to any authority whatever.

The CHAIRMAN: That is hardly a matter for us.

Mr. PADDON thought there should be an undertaking that the Company should observe all the conditions they were now under. (To witness:) If this whole question is dropped, will you abide by the law until you next come to Parliament? (Loud laughter.)

The CHAIRMAN: I think we will not discuss the question of broken law.

THE QUESTION OF THE FREE HALF-CANDLE.

Lord ROBERT CECIL next brought up clause 3:—

(1) Notwithstanding anything contained in the Gas-Works Clauses Act, 1871, the Company shall, in respect of the first half-candle by which the illuminating power of the gas supplied by them is below the standard number of candles, be liable to a penalty not exceeding 40s.

He pointed out that sub-sections 2 and 3 were merely a repetition of the existing legislation as to the Company. He asked Sir George to explain why he wanted this clause.

Witness: With a 15-candle gas, we are compelled to enrich; but we are subject to a penalty if the gas falls even the hundreth part of a candle below 15. We ought not to be subject to a penalty unless the deficiency amounts to half-a-candle; and for the first half-candle the penalty is not to exceed 40s. This is to allow for irregularities and uncertainties of testing; the Company should not be penalized for an infinitesimal deficiency which may be due to testing. Then the Company are under a great disadvantage. We are penalized on a single case. The London Companies have only been penalized on the average of three tests; and now you have made it three days of three tests each. We are subject to a penalty on one test; and that test may vary to such an extent as to make us liable when we ought not to be. If we are to comply with this, we must always supply gas considerably over 15-candle power. For this purpose, we must enrich. We shall enrich with petroleum spirit; and all this enrichment is sheer waste, for which the consumer has to pay. Therefore we ask, as a measure of fairness, that we shall have the same treatment as has been in operation in London for thirty years.

CROSS-EXAMINED BY MR. FREEMAN.

Mr. FREEMAN: At the present time, your penalties are regulated by the Gas-Works Clauses Act, 1871, section 36?

Witness: Yes.

The provision is:—

If it shall be found to the satisfaction of any two Justices not being shareholders in the undertaking, after hearing the parties, that on any day the gas supplied by the undertakers is under less pressure or less illuminating power . . . . than it ought to be according to the provisions of this or the Special Act, the undertakers shall in every such case forfeit and pay to the local authority or other persons making application for testing the gas such sum not exceeding £20 as the Justices shall determine.

That is your present liability?—Yes.

The provision with regard to the half-candle is taken from the London Acts?—Yes.

The corresponding provision in the London Acts is this:—

If on any day the gas supplied by the Company at any testing-place is of less illuminating power than it ought to be under the Special Act, the Company shall be liable to the following forfeitures: For the first half-candle of defective power, 40s.; and for the first and every subsequent candle of defective power, a sum not less than £25 and not exceeding £100, having regard to the relative quantities of gas manufactured by the respective Companies.

This clause, as it stands, would give you the benefit of the 40s. for the first half-candle, but still leave you at the maximum penalty beyond that of £20, as compared with £100 in the London Acts?—Yes; but this applies to the Gaslight and Coke Company, which is twenty times the size of the South Suburban. Therefore, in proportion, the maximum ought to be £5.

In reply to further questions, witness said he would not press the alteration with regard to the 40s. penalty at half-a-candle. The £20 maximum penalty would remain; but up to the first half-candle the Company should be free from penalty. For instance, at 14·5 candles they would be liable to the £20 maximum, but would be free at 14·6 candles.

Mr. FREEMAN: You want to alter your present illuminating power?

Witness: No. The London Companies have never used it in that sense. It is only to save us from accidental variations.

Inasmuch as you have withdrawn your suggestion for an alteration of the illuminating power, and for a corresponding payment to the authority in respect of that, I suggest you should leave over any alteration of the existing position as to penalties with regard to illuminating power?—We should have to supply at least 15½-candle power, on the average; and this will necessitate a considerable amount of enrichment, for which the consumer will have to pay eight-ninths of the cost for no benefit.

In other words, you will have to continue exactly as you are doing to-day?—It is unfair. We are penalized now if we go down a hundredth part of a candle below 15; and this is unreasonable. The Local Authorities take advantage of the slightest thing.

You do not want the London test?—No.

But you want to have the advantage of the London penalties?—It is a fair system. I got it myself.

CROYDON ASKS FOR A TESTING-STATION.

Witness was then cross-examined by Mr. J. D. WILLIAMS, on behalf of the Croydon Council [who desired to have a testing-station], as to the distance of the station at Beckenham from the centre of Croydon. He said it was about 2 miles from the gas-works. He did not know how far it was from Croydon.

Mr. WILLIAMS: The main reason for clause 3 is that, inasmuch as you have to enrich, the deterioration in the gas takes place in the mains?

Witness: It may be. The enrichment sometimes carries, and sometimes does not.

You have rested your case upon this; and if it is accurate, it is obvious that the testing should take place where the gas is actually supplied to the consumer?—No; I deny that altogether. It never has been provided. Parliament has always prescribed that gas shall be tested by samples taken from a large main, but not from the extremities of the main.

The CHAIRMAN: If all these places want them, you would have to put up five more testing-stations?

Witness: That is so.

The CHAIRMAN: We have decided against you, Mr. Williams.

THE FREE HALF-CANDLE AGAIN.

In cross-examination by Mr. PADDON, witness said that 15-candle power was very common in Suburban Companies. It was forced upon them by the authorities in 1893; and they made a mistake. Many companies had been reduced to 14 candles. Wherever a company had to supply 15 candles, they had, as a matter of course, to make about 15½-candle gas.

Mr. PADDON: Therefore that is a condition common to all standards of supply?

Witness: Then I say, with regard to that, consideration ought to be given to the excess that the Gas Companies give. On the average they give a large excess over the measure they are required to supply—half-a-candle throughout the year. On the rare occasions when it is below, we ought not to be penalized for less than half-a-candle.

Is it not the fact that you announced your intention to distribute 14-candle gas?—Yes; but we never did distribute 14-candle gas.

Mr. PADDON asked the Committee to say that, as this was the only Company who had done that sort of thing, they should not have what they now asked.

The CHAIRMAN: You are bringing up the question again of the Company having broken the law. We have nothing to do with that. We have to make laws; not to enforce them.

Mr. PADDON (to witness): You say the Local Authorities have persistently prosecuted you on the slightest pretext?

Witness: Well, they have not had much chance.

Is it not the fact they have only proceeded against you once?—Lewisham did once.

That is the whole of the persecution?—Yes. I did not use the word "persecution."

Therefore, this is the one attempt they have made to get their rights, in view of your threat to supply gas under the statutory requirement?—Because they did not find it under the statutory requirement.

On that occasion you were eight-tenths of a candle under, were you not?—I forget what it was. We were penalized for it. It was only once.

The CHAIRMAN: In your case, it is rather more of a favour to have what you ask, because you are not under the strict test as the London Companies are?

Witness: We are precisely the same as the London Companies were until the present time.

And they always had this half-candle?—Yes. I was the witness through whom it was given. I was a witness for the Metropolitan Board against the Gas Company; and I pointed out it would not be fair to make them subject to these extreme penalties for a very small deficiency. Testing is not a certain process.

Mr. FREEMAN submitted that clause 3 ought to go, seeing that clause 2, which related to the alteration of the illuminating power, had been withdrawn. Inasmuch as Sir George Livesey had, by such withdrawal, left himself all the advantages, or disadvantages, he at present had, he submitted he ought to be under the same conditions with respect to penalties. None of the Companies outside London had the half-candle provision. Sir George wanted the benefit of this, but did not wish to be under the same liability—viz., from £25 to £100. The whole thing was premature.

The Committee-room was cleared. On the re-admission of the parties,

The CHAIRMAN said: The Committee have come to the conclusion that clause 2 and clause 3 hang together. It is entirely on this account, and not on the merits of the question whether they ought or ought not to have the half-candle, that we strike out clause 3.

THE PREAMBLE OF THE BILL PROVED.

Lord ROBERT CECIL: Will you declare the preamble of the Bill proved?

The CHAIRMAN: So far as it remains, I declare the preamble of the Bill proved.

The clauses were then adjusted; and the Chairman was ordered to report the Bill, as amended, to the House.

PROTECTION FOR THE SWANSEA GAS COMPANY.

The Bill promoted by the Swansea Corporation to make provision for the acquisition by them of the undertaking of the Swansea Improvement and Tramways Company, and to confer further powers upon the Corporation with regard to their water undertaking, &c., came last Tuesday before a Select Committee of the House of Commons presided over by Mr. Stevenson. Objection had been taken to the Bill by the Swansea Gas Company; but their opposition was withdrawn, on an agreement being arrived at to insert the following clause: "For the protection of the Swansea Gaslight Company (in this section called the 'Gas Company'), the following provisions shall, unless otherwise agreed between the Corporation and the Gas Company, apply and have effect: (1) Before executing any works by this Act authorized, the execution of which will interfere with any mains, pipes, syphons, tubes, or other works (in this section called 'apparatus') of the Gas Company, the Corporation shall (except in case of emergency) deliver to the Gas Company a notice of the intention to execute such works, accompanied by plans and sections thereof. Such notice, plans, and sections shall (except as aforesaid) be delivered to the Gas Company at least twenty-eight days before the execution of such works; and any interference with the apparatus of the Gas Company shall be effected to the reasonable satisfaction of the Gas Company and under their superintendence, if such superintendence be given. (2) If in the execution of the said works the Corporation shall injure any apparatus of the Gas Company, the Coporation shall pay compensation to the Gas Company in respect of such injury; and the amount of such compensation shall, unless otherwise agreed, be determined by arbitration. (3) If any difference shall arise with respect to any matter under this section between the Corporation and the Gas Company, the matter in difference shall be referred to, and settled by, an arbitrator to be appointed, on the application of either party, by the President of the Institution of Civil Engineers; and the provisions of the Arbitration Act, 1889, shall apply to every such reference."

LONDON ELECTRICITY SUPPLY BILLS.

THE POSITION OF GAS COMPANIES.

A Select Committee of the House of Lords, presided over by the EARL OF CAMPERDOWN, commenced on Friday, the 17th inst., the consideration of a group of Bills having for their object the supply of electric power in the Metropolis. The titles of the Bills are as follows: Administrative County of London and District Electric Power Company, Central Electric Supply Company, Charing Cross and Strand Electricity Supply Corporation, City of London Electric Lighting Company, County of London Electric Supply Company, East London and Lower Thames Electric Power Company, Metropolitan Electric Supply Company (Acton District), Metropolitan Electric Supply Company (Various Powers), and North Metropolitan Electric Power Supply Company.

The first Bill taken was the Administrative County of London and District Electric Power Company Bill, which is strongly opposed, among a large number of other companies, local authorities, &c., by the Gaslight and Coke, Kingston-upon-Thames, Dartford, South Metropolitan, and Hampton Court Gas Companies.

THE GAS COMPANIES' OBJECTIONS.

In the course of his opening speech for the promoters, the Hon. J. D. FITZGERALD, K.C., after dealing with the petitions against it of the other electrical supply companies, referred to the petitions of the gas companies. He said that certain of the companies who wanted protection for their pipes and mains thought the protection under the General Acts was not sufficient, and some objected to the Bill on the ground that it would compete with them. If the Committee looked at the petition of the Gaslight and Coke Company, they would see what they said: "Your petitioners, in respect of their lighting business, have already severely suffered from the competition of electric lighting companies and Metropolitan Borough Councils authorized under Acts of Parliament or Orders confirmed by Acts of Parliament to supply electrical energy for purposes in competition with your petitioners." Well, they were suffering from competition already. "Your petitioners most humbly submit that their undertaking will be subjected to a new and severe competition if the powers sought by this Bill be granted. Your petitioners will be subjected to increased direct competition as between themselves, as producers of gas, on the one hand, and companies supplying electrical energy for purposes in competition with gas on the other hand. Moreover, if the Bill be passed, a new competition will result between the new company on the one hand and the existing electrical companies in London on the other, in the course of which the price of electrical energy supplied for heating and power purposes may be subjected to considerable temporary reduction and fluctuation during the periods of competition—causing consequent further loss and disturbance to the business of your petitioners." This paragraph was not very clearly expressed, but he thought what it meant was this—that the petitioners thought the establishment of a company of this kind would result in a considerable diminution in the price of electrical energy in London, and that in consequence the competition between the Electric Lighting Companies and the Gas Companies, which was a lighting competition mainly, would be carried on more effectively by the former in London. He could not think that this was any reason against the Bill. Then if their Lordships turned to the petition of the South Metropolitan Gas Company, which was the only other large London Gas Company who had petitioned, they would see that the petitioners raised the question of competition, and also the question that, under the powers contained in the Bill, it was proposed to take some portions of land belonging to them, which he thought was not at present used by them, for the purposes of one of the generating stations. Whether or not this had been arranged, he did not know. They raised the question of competition in paragraph 11: "Your petitioners submit there is no necessity for any of the powers sought by the Company. Your petitioners, by the supply of gas, and the existing electric supply companies by the supply of energy, can meet any demand for power that is likely to arise in London; and your petitioners and the said electric supply companies are under obligation to supply any consumer, however costly such supply may be, and however small the quantity supplied may be." This was true, but at a price. "The Bill imposes no similar obligation upon the Company, who will be enabled to select among the various consumers of power those from whom they can obtain the highest prices for energy, and will thus compete very seriously with your petitioners under conditions which will render the competition very unfair to your petitioners." He thought their Lordships would find that this was not so under the provisions of the Bill.

The CHAIRMAN: Is there no obligation on you in the Bill to provide?

Mr. FITZGERALD said there was. If their Lordships looked at the Bill, they would see that there were several clauses similar to those that were arranged in the other Bills. Clause 50 dealt with the supply to authorized undertakings. "The Company shall, upon being required to do so by any authorized undertaker, give and continue to give to that undertaker, at such point or points within the area of supply of such undertaker as they may reasonably require, a supply of energy; and they shall furnish and lay such electric lines as may be necessary for the purpose of supplying to such undertaker at such point or points the maximum power with which such undertaker may be entitled to be supplied under this Act, subject to the conditions following." Then the conditions were set out.

The CHAIRMAN: But that clause, of course, only deals with authorized undertakers, and does not deal, for instance, with manufacturers.

Mr. FITZGERALD asked his Lordship to turn to clause 52: "The Company shall give a supply of energy to any person (other than an authorized undertaker) upon that person entering into a binding contract to continue to receive and pay for a supply of energy upon such terms and conditions," &c. He added that there was also the general obligation under the Electric Lighting Act, 1882, and subsequently proceeded to deal with other petitions against the Bill.

THE CASE OF THE SOUTH METROPOLITAN COMPANY.

Last Tuesday, Mr. *C. H. Merz*, Consulting Engineer, who was the first witness called in support of the Bill, and whose evidence had extended over three days, was further cross-examined by Mr. BALFOUR BROWNE, K.C., for the South Metropolitan Gas Company. In reply, witness said the Company proposed to have three stations and to begin with the southern one, at Greenwich. Supposing the Bill passed with two other stations, without Greenwich, he did not know how long they would be able to go on. It would take a considerable time depending entirely on the progress of the undertaking. He thought they might be able to go on for a good number of years with the two other stations.

Mr. BALFOUR BROWNE: I dare say you know that a part of the land you have scheduled was given, under compulsory powers, to the South Metropolitan Company only two or three years ago.

Witness: I believe that was so.

Are you aware that the Company have large works existing close to your proposed site, that about two years ago they sought to get some of this land, and Parliament gave them a site which is indicated on the map?—Yes.

Are you aware that Parliament also authorized them to make a line of railway from the South-Eastern system running through the property in that way?—Yes.

If you take that portion of their land, the railway will be impossible, will it not, and our access to the river at that point will be impossible too?—Yes.

I am not going to argue the question whether you shall have it or not; but, of course, there is no question that, if you get it, you would be a very important rival to a light-supplying concern like the South Metropolitan Gas Company?—Yes.

In answer to the Chairman, Mr. BALFOUR BROWNE said the Company had not at present any actual works on the land just referred to. The railway would run right through it; but this has not been commenced. Their works would, however, very soon be begun on it; and one of the important things the Company secured was access to the river.

The CHAIRMAN (to witness): Can you tell me what was the reason you fixed on this site, knowing of this, as you did?

Witness: It was the only available site in the neighbourhood.

Mr. BALFOUR BROWNE: There are a great number of sites available further down the river.

Witness: We should have to go very much further down.

But still, advantages having been given to one Company by Parliament only two years ago, it is a hard thing to ask them to give them up. Next door here is the South-Eastern Railway. Our line is to run over the South-Eastern there; and I find in the agreed clauses one for the protection of the South-Eastern: "Notwithstanding anything in this Act contained, or shown on the deposited plans, the Company shall not, under the provisions of this Act, except by agreement, acquire, purchase, or take any lands at Angerstine's Wharf, in the parish of Greenwich, belonging to the Railway Company." That is Angerstine's Wharf, and this is my land. Will you give me a similar clause that you shall not take any of my land without my consent and agreement?—I am not sufficiently acquainted with the plan to say; but now we know what you want.

Mr. BALFOUR BROWNE: I know what I want. Am I going to get it?

Mr. HONORATUS LLOYD: If my friend will let us have the plan, we will certainly consider it and tell him.

Mr. BALFOUR BROWNE: That is reasonable. You protect the South-Eastern; and I want similar protection.

The CHAIRMAN: Would the other land be sufficient for them to put up their generating station upon?

Mr. BALFOUR BROWNE: I would not like to say.

The CHAIRMAN: You see that is a material point.

THE CASE OF THE GASLIGHT AND COKE COMPANY.

Mr. WILKINSON: I appear for the Gaslight and Coke Company and another Gas Company; and I am very much in a similar position to my friend Mr. Balfour Browne. I should like to ask a question or two.

The CHAIRMAN: With regard to the same portion of land?

Mr. WILKINSON: No, with regard to the other generating station which is proposed at Fulham. Counsel then proceeded to cross-examine the witness.

Mr. WILKINSON (to witness): Do you see the generating station on the map?

Witness: Yes.

Is that land at the present time belonging to the Gaslight and Coke Company?—I was not aware it did. You will have another witness to speak as to sites; but, if it is a similar point, if you let our Counsel know what you want, it shall be considered.

You would hope to compete, would you not, to some extent, with the Gaslight and Coke Company, whose area is the same as yours practically in that part of the world?—I should hope we should take some of your gas-engine consumers.

You would compete with them to a certain extent, would you not? You say in clause 30 of your Bill that you propose to manufacture gas on the area of the generating station—to what extent?

The CHAIRMAN: But if you read it, if my memory serves me correctly, it is for the purpose of power—not for lighting.

Witness: No, we do not want to sell it.

Mr. WILKINSON: It is purely for the purposes of the area.

Witness: Yes.

The CHAIRMAN: I do not know whether I am right, but I think you will see, if you look at the clause, that it is for generating purposes.

On the following day (Wednesday), Mr. *Merz* was recalled, and cross-examined by Mr. PADDON.

Mr. PADDON: I would like to put a question or two upon a point which was touched upon in cross-examination yesterday, but by no means cleared up. May I take it that, while you seek powers in clause 7 to manufacture gas, you have no intention or desire to distribute it in competition with the existing Gas Companies?

Witness: Absolutely none.

Then would you have any objection to insert in clause 47 the words "or gas" twice over at the end, so as to make it perfectly clear?

The Hon. J. D. FITZGERALD: There is no intention whatever to supply gas in competition with any Gas Company; and if there is any ambiguity in the clause, and my friend will show it to me, I will have it remedied.

Mr. PADDON: That is all I want. The point is this—that in clause 47 (intention or no intention) they have the absolute machinery for distributing gas. They say they do not want to; and if they will insert the two words to remove ambiguity, I shall be satisfied.

The CHAIRMAN: Mr. Fitzgerald says he is willing to make it clear that he does not intend to distribute gas. Then will you confer with him about the clause, supposing we get there?

Mr. PADDON: Yes, my Lord. That removes my opposition.

THE KINGSTON GAS COMPANY'S OBJECTION.

Mr. HUTCHINSON: I appear also for the Kingston Gas Company; but I do not intend to take up any time now. When clauses come up, if they are reached, on the general question of competition, I must ask to trouble the Committee.

The CHAIRMAN: The question of competition has been very thoroughly gone into. It has been proved that it is competition, though not absolutely direct competition. It is competition of a sort, and the witness has admitted it.

UNFAIR COMPETITION.

Mr. *S. Z. de Ferranti*, in the course of his evidence, was cross-examined by Mr. ROGER WALLACE.

Mr. WALLACE: In the case of the Gas Companies, when the existing stations became too small to supply the wants of the neighbourhood, then the Gaslight and Coke Company, for instance, moved their works out to Beckton.

Witness: I do not know whether it was because they got too small; but it was the gradual education in the business of gas supply. It taught people the same things we have been trying to argue here as tending to cheapness applied to gas. We have only learned the lesson from the Gas Companies; we have invented nothing fresh.

But it was left to the Gas Companies themselves to put up their own works outside London, not to a new Company?—I believe they had very much larger areas; and the position was not at all comparable as regards what they might do with what electric undertakings might do under the existing Acts.

Is it not the fact that it was left to the existing Gas Companies to put up their big works outside when the other works became inconvenient?—I do not know of my own knowledge; I only see the result. I suppose that is so.

Do not you think that is a fairer way than to allow a new Company to come in and take the benefit of the hard work of the existing Companies?—I see no chance of sixty concerns combining together to do the work.

But do not you know there were a great many Gas Companies at first that were amalgamated to make the Gaslight and Coke Company?—I know there were about five Gas Companies in the Strand.

Have you ever known in the supply of any other commodity a precedent of this kind—taking away from the existing people the work they had built up, and giving the increase of business and improvement to other people?

The CHAIRMAN: It is assuming a good deal to say "take away." Witness has said over and over again that he does not propose to take it away. What witness says is that the existing concerns cannot do so as cheaply as the new Company can.

Mr. WALLACE: What I am putting is this: Supposing there is proved to be a demand for power in London, is there anything to prevent any of the existing Companies putting up a station exactly similar to this proposed station, and finding the capital themselves to do it?

Witness: There is a difficulty. There is no district, or no several districts, large enough, if combined together, to put up a scheme as comprehensive as we have endeavoured to lay before the Committee.

AN EXPLANATION BY THE CHAIRMAN.

At the outset of the proceedings on Thursday,

The CHAIRMAN said: Before we begin, there is a matter which I must mention in compliance with the rule of the House that any member of a Committee who is directly or indirectly interested in any of the parties is to disclose it. I am sorry to say it appears that I am interested as a shareholder in one of the petitioning Companies—the South Metropolitan Gas Company. They have not a Bill, and, of course, they are not an electric lighting company; and it did not occur to me until yesterday that I was interested. Their petition, if I remember rightly, is chiefly concerned with a part of their property which it is proposed to take; and I believe Mr. Fitzgerald and Mr. Balfour Browne—if I remember correctly—are considering whether they can arrange the matter. But whether they can or cannot, of course, I shall take no part whatever in any decision of the Committee in which the South Metropolitan Gas Company are in any way interested; and I hope if I did it would only make me even more than ordinarily careful not to abandon an attitude of strict impartiality towards all the parties.

The Hon. J. D. FITZGERALD: The Engineers are discussing the point. It is a matter of arrangement; and I hope your Lordships will not be troubled with it at all.

The Committee adjourned until yesterday (Monday).

The Robertsbridge and Salehurst Water Company, Limited, has been registered with a capital of £12,000, in £5 shares (1200 being 6 per cent. preference), to adopt an agreement with the Gas and Water Works Supplies and Construction Company, Limited, and to carry on, in the United Kingdom or elsewhere, the business of a water-works company in all its branches.

NORTH SUSSEX GAS BILL.

This Bill, the object of which is "to incorporate the North Sussex Gas Company and to enable that Company to supply within certain parishes in the county of Sussex," was in the list of Bills to be considered on Thursday last by a Select Committee of the House of Commons, presided over by Mr. Agg-Gardner.

The only petition against the Bill was that of Mr. Joyes and others, the owners of properties within 300 yards of the site of the gas-works proposed to be constructed under the Bill. Certain variations, however, in the original proposal with regard to the site having been agreed to, this opposition was withdrawn. The Bill was accordingly referred back, and will come in due course before the Committee on Unopposed Bills.

POLICE AND SANITARY COMMITTEE.

OTLEY URBAN DISTRICT COUNCIL BILL.

This Committee, of which Mr. J. W. Wilson is the Chairman, had before them last Wednesday, the Bill above named. As originally drafted, it was, among other things, to empower the District Council of Otley to supply gas and provide for the transfer to them of the undertaking of the Otley Gas Company; but Mr. Vesey Knox, K.C., (with whom was Mr. Jeeves), who appeared for the promoters, stated at the outset that the gas portion of the Bill had been struck out. He explained that a poll was demanded at the public meeting, and 680 voted against the gas part of the Bill and 627 for it. He also pointed out that the Otley Gas Company came to Parliament in 1901 for statutory powers; and, in accordance with what had become almost a universal practice, on the request of the Council, a clause was put in the Bill that the Council should have the right of acquiring the undertaking within four years; so that this was the last year within which it could be done. The Committee proceeded to deal with the other parts of the Bill.

HOUSE OF COMMONS COMMITTEE.

Fifth Day—Tuesday, March 21.

(*Before Captain* JESSEL, *Chairman, Mr.* RECKITT, *Mr.* PEEL, *and Mr.* HIGHAM.)

SUNDERLAND AND SOUTH SHIELDS WATER BILL.

[By inadvertence, mention was omitted from the report in last week's "JOURNAL" on the Sunderland and South Shields Water Bill of the fact that Mr. H. Ashton Hill, the Engineer of the South Staffordshire Water-Works Company, gave evidence on behalf of the promoters. Mr. Hill dealt with the alleged possibility of the pumping of underground water affecting the surface of the land. He said his Company had a large pumping plant penetrating the red sandstone. In his opinion, the fears expressed by the petitioners, that the promoters' pumping operations would cause a subsidence of their land, were quite groundless. Such a thing had never happened within his experience.]

WATER TO BE SOFTENED.

The CHAIRMAN stated that the Committee had consulted, and had no doubt that the Corporations had made out their case as regarded softening the water. It seemed to the Committee, though they did not know, that the softening could be done for ½d. per 1000 gallons; and they suggested that softening to get rid of the temporary hardness should be carried out by the Water Company—the Company, if the cost exceeded ½d., to be entitled to charge *pro tanto* for the water supply the net additional cost.

Mr. VESEY KNOX pointed out that, under the Bill, owing to the parliamentary notices that had been given with regard to it, they could not increase their charges to anybody.

The CHAIRMAN said that the Corporation were using the water of the Company for trade purposes at the reduced rate of 5d. per 1000 gallons. Could not a clause be inserted so that if the cost of softening was more than ½d. per 1000 gallons the Company could recoup themselves by raising the 5d.?

Mr. VESEY KNOX thought there would be no difficulty in repealing the clause in the Act of 1891, which gave the 5d. rate to the Corporation, and substituting (say) a price fixed by arbitration.

Mr. JEEVES said he wished to make another suggestion. He would give an undertaking that if, after softening the water, the Company found it cost more than ½d. per 1000 gallons, his clients, representing from three-fourths to four-fifths of the population supplied, would not oppose an application by them to Parliament to increase their charges to such an extent as would cover the difference.

THE QUESTION OF PRESSURE.

The CHAIRMAN, with regard to the question of pressure, said this seemed to turn on the size of the pipes. The Committee did not want to put too heavy a burden on the Company, but they thought the pressure ought to be given.

Mr. VESEY KNOX said the Agents had prepared the following clause on this point: "In the event of any dispute arising between the Corporations and the Company as to the adequacy of any of the existing mains of the Company for the supply of water in accordance with the provisions of the recited Acts, and the Acts incorporated therewith, the matter shall be settled by an arbitrator to be appointed by the Institution of Civil Engineers." Under an arbitrator's award, the Company would then have to put in a main of sufficient size to give a pressure adequate for all domestic purposes.

Mr. JEEVES thought the clause proposed would land them in a technical difficulty.

Further discussion having taken place, consideration of these and other points was adjourned to enable the parties to confer upon them.

PUMPING OPERATIONS AND SUBSIDENCE.

The petition of Mr. Pemberton and the two Colliery Companies was then proceeded with.

Mr. *W. O. Wood*, a mining engineer, stated that he had not the slightest doubt that subsidence occasioned by the withdrawal of water existed. There was a general subsidence of from one to two feet over the whole of a tract of about 1100 acres of virgin coal belonging to the Easington Coal Company, and situated near the Thorpe pumping-station. There was absolutely nothing to account for the subsidence except the withdrawal of the water underneath.

Witness having been cross-examined,

Mr. FREEMAN submitted that if there were two bodies, one working at such a depth that, scientifically speaking, they could not be causing subsidence of the surface, and another body was pumping near the surface, and if it could be shown that the damage caused to the surface synchronized with the pumping and not with the getting of coal, and was near the pumping and far from the coal, surely he ought not to be precluded from getting the advantage of protecting himself and putting the other coal workers in the same position as he was himself; surely the owner of the surface ought to have a right of remedy against the persons doing the damage.

The Committee, without calling on Counsel for the Bill, decided that they could not alter the general law on this subject.

SUPPLY TO RURAL DISTRICTS.

The petition of the Sunderland Rural District Council was next dealt with; and in the result the Committee decided that if the Company were required by the Local Authority to extend their mains for the supply of portions of the rural district not at present supplied, they should be given a ten years' guarantee (instead of five as suggested by the Council), and that the present charge of 1s. 1½d. per 1000 gallons for water required by the Council for flushing purposes should be reduced to 9d., with a further reduction (to be arranged subsequently) if large quantities were taken.

WEST HARTLEPOOL GAS AND WATER COMPANY'S OPPOSITION.

Lord ROBERT CECIL, for the West Hartlepool Gas and Water Company, said the question which he wished to bring forward was whether a case for granting the proposed wells, and particularly those in the southern district, had been made out. There was no pretence that the southern wells were wanted locally; the adjacent district being very sparsely populated. It was said that they wanted water for the supply of the northern part of the district; and for that purpose, while there was not much necessity for any of the four wells, there was certainly none for the two southern, which would affect his clients most. He submitted that the wants of the Company had been very greatly exaggerated, and that if any wells were justified at all no case was made out except for the two northern ones; the evidence going to show that from one of them alone nearly the total quantity said to be required would be obtained. Moreover, the Company had not taken all the water they could from their own district.

Mr. *Thomas Bower*, the General Manager of the West Hartlepool Gas and Water Company, stated that the population of Hartlepool had grown from 41,000 in 1880 to 94,224 at the present time; the amount of water supplied for all purposes in the same period having risen from 426,000,000 gallons per annum to 13,058,000,000 gallons. In all probability, the next fifteen years would see an increase of at least 50 per cent. in the Hartlepools. If anything happened to their existing well, they would have to go to the district scheduled by the promoters.

Mr. *C. R. Fenwick*, a member of the firm who designed and constructed the Hartlepool Company's storage reservoirs, regarded the proposals of the Bill with reference to sinking new wells as a very serious menace to the future of West Hartlepool. It would minimize the danger if the promoters acquired only the two northern wells. This would leave the Hartlepool Company free to go westward if anything occurred to their supply on the coast.

Sixth Day—Wednesday, March 22.

SUMMING UP THE CASE FOR THE PROMOTERS.

Mr. HOLMAN GREGORY, in replying on the Bill, said he had only really to deal with the petition of the West Hartlepool Gas and Water Company, because the Committee had practically already given decisions with regard to the other opponents. The Hartlepool Company urged that the promoters should not be allowed to go to the proposed new area because that was the district to which they (the Hartlepool Company) would naturally wish to go if they had to obtain further supplies. But this contention, as he understood, did not apply to any part of the area of the Easington Council, which district could not be said to be part of the country to which the West Hartlepool Company would be likely to go, or would have any kind of right to go. He submitted therefore that at least a clear case had been made out by the promoters with regard to the Easington area. As to the remainder of the proposed new area, no evidence had been called to show that the promoters were wrong in saying that within fifteen years they would require the pumping-station and water which it was hoped would be obtained from it. It was not sufficient for the Hartlepool Company to say they had a prior claim to any water that might be obtained there. Surely the Hartlepool Company had also to show that there was reasonable probability that they would require the water; and this they had not done.

COMMITTEE'S DECISION.

The CHAIRMAN said the Committee were of opinion that the promoters had made out their case for obtaining the portion of the proposed additional area which was contained in the boundaries of the Easington Council—viz., the parishes of Castle Eden, Monk Hesleden, Sheraton with Hulam, and Hutton Henry. The other parishes—viz., Butterwick, Oldacres, Embleton, and Elwick Hall in the proposed area would not be included in the additional limits. The Committee also decided to allow the fittings clause, which was in the model form.

Further discussion having taken place, the preamble of the Bill was declared proved, and the consideration of the clause to give effect to the decisions of the Committee, together with the question of the exact number of wells to be granted, was postponed.

Seventh Day—Thursday, March 23.

THE ADJUSTMENT OF CLAUSES.

Mr. THESIGER said the Hartlepool Company had arranged with the promoters the insertion of the following clause:—

For the protection of the Hartlepool Gas and Water Company (in this section referred to as "the Hartlepool Company"), the following provisions shall be obligatory and binding upon the Company: Notwithstanding the powers by section 13 of this Act conferred upon the Company to temporarily discharge water into any available stream or watercourse, the Company shall not from any of the wells and pumping-stations by this Act authorized discharge any water so as to flow into any of the existing gathering grounds of the Hartlepool Company, but shall discharge or convey all such water into such streams or provide such artificial means as shall prevent the same flowing into any of the impounding reservoirs now existing or authorized of the Hartlepool Company.

Discussion then took place on the clauses which had been prepared to carry out the decisions of the Committee. In the result, the obligation was imposed on the Company to "soften by lime and clarify" all the water they supplied, within a period of three years; any dispute as to whether the water was being softened sufficiently to be settled by arbitration. The Committee refused to specify the reduced degree of hardness to which the water should be softened. Another clause was agreed to, declaring that if the Company contended that the cost reasonably and properly incurred by them in and about such softening exceeded the sum of ½d. per 1000 gallons of water softened, such cost should (if not agreed upon between the Company and the Local Authority) be determined by arbitration; and if such cost should be found to exceed ½d., the excess should be borne by the consumers throughout the Company's limits of supply. Further, for the purpose of giving effect to this enactment so far as related to domestic supply, the Company should be at liberty, without opposition on the part of the Corporations of Sunderland, South Shields, and Jarrow, or of the Urban District Council of Hebburn (except on matters of detail) to apply to Parliament for power to increase their rates for domestic purposes to reimburse the Company the cost of softening in excess of ½d. A proposal that, in view of the burden imposed on the promoters in regard to softening, the charge of 5d. per 1000 gallons for water taken for public and trade purposes should be increased to 7½d., was refused. The pressure clause was limited in its application to the areas of the three Corporations and of the Hebburn Council. It dealt with the provision of mains, and directed that, in the event of dispute as to their adequacy, the matter should be referred to arbitration. On behalf of the Sunderland Rural District Council, a clause was inserted under which, when the total quantity of water taken by the Council in one quarter does not exceed 500,000 gallons, the price shall be at the rate of 9d. per 1000 gallons; and for every additional 250,000 gallons per quarter, the rate per 1000 gallons shall be ¼l. less —the price in no case, however, to be less than 8d.

CAPITAL POWERS AND PUMPING WORKS.

Evidence was then called with regard to the capital required and one of the proposed wells.

Mr. *Hawksley* said that the saving that would be effected by omitting pumping-station No. 1 from the Bill would be £121,979. The cost of softening the water would be at least £150,000. In cross-examination, witness denied that from £5000 to £7000 would be a very ample figure for the works that would have to be erected at each station.

Mr. *Brough Taylor* said that he had had considerable experience of the cost of softening water; and his estimate in this case, based upon his knowledge of the district, was that a capital outlay of about £20,000 per million gallons would be required. His total estimate would therefore be much larger than that of Mr. Hawksley. The cost in the Colne Valley worked out to £18,000 per million gallons; but there there was only one station, so that the figure was lower than it would be here.

Mr. *J. J. Lackland*, the Engineer to the borough of St. Helens, said there they softened about 3 million gallons daily, at a capital cost of rather over £12,000, in which was included the cost of some alterations of the works. The hardness in that case was reduced from 22° to 9°. In the case of the Sunderland Company, the cost of plant which would soften a million gallons daily in a perfectly satisfactory manner should be about £6000 to £7000.

Ultimately the Committee decided that they would not allow one of the proposed new pumping-stations; and that they would reduce the proposed share capital from £600,000 to £500 000, and the borrowing powers from £150,000 to £125,000. The time for the completion of the works would be ten instead of fifteen years.

The remaining clauses having been adjusted, the Bill as amended was ordered to be reported to the House.

Compensation for the Batley Gas-Works Fatality.—It will be remembered that, in addition to the Engineer (Mr. J. F. Bromley), a workman lost his life in the sad suffocation accident at the Batley Gas-Works in January. This man (who was named Sandall) was married, but had no family; and his widow has now been awarded £206 14s. as compensation.

Whitby Gas Company.—According to the accounts presented to the shareholders of this Company at their meeting on the 18th inst., there were 37,913,800 cubic feet of gas sold last year to the ordinary consumers, producing a revenue of £6791 8s. The total receipts amounted to £9543, and the expenditure to £6302; leaving £3241 to go to the profit and loss account, the balance on which, after providing for the interim dividends to the 30th of June, was £1466. Dividends of 5 and 3½ per cent. for the six months ending Dec. 31, were declared, absorbing £1354, and leaving £112 to be carried forward.

LEGAL INTELLIGENCE.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Wednesday, March 22.

(*Before the* LORD CHIEF JUSTICE *and Lords Justices* VAUGHAN WILLIAMS *and* STIRLING.)

Attorney-General and Others v. Metropolitan Electric Supply Company, Limited—Supply of Current in an Unauthorized Area.

This was an action brought by the Attorney-General, on the relation of the Willesden Urban District Council, and by the Council, for an injunction to restrain the defendants from contravening the provisions prohibiting them from supplying energy beyond their area of supply, as defined by the Acts of Parliament under which their statutory undertakings were held. The Company was incorporated in 1887, and under their Memorandum of Association had full and unrestricted powers of acquiring land, erecting works, and producing and supplying electric energy. By section 5 of their Act of 1889, it was provided that "the undertakers shall not at any time after the passing of this Act supply energy, or (except for the purposes of this Act) erect or lay down any electric lines or works, beyond the area of supply otherwise than under the authority of Parliament or under a Licence granted by the Board of Trade." Owing to the increase in the demand for current, the Company found it practically impossible to provide adequate station accommodation within the area of supply—viz., within the area of the Administrative County of London. They accordingly acquired land at Acton and Willesden, and obtained statutory powers to supply from these new generating stations current to their distributing stations and also to the London and North-Western Railway Company. The Willesden Urban District Council objected that this was a violation of the statutory prohibitions contained in the Company's Acts and Orders, and was illegal. The action was originally tried by Mr. Justice Farwell last October, as reported in the "JOURNAL" at the time; and he granted the injunction. From this decision, the Company appealed.

The LORD CHIEF JUSTICE, in delivering judgment, said that he was unable to give to section 5 of the Act of 1889 any other construction than that which had been put upon it by Mr. Justice Farwell. His Lordship agreed that the main object of the Act was to provide for the Metropolis—to carry out what was recognized as the best scheme for the Administrative County of London. But he was unable to follow the argument that one was entitled to disregard the outlying areas. The words of section 5 of the Act must be taken in their natural sense. It seemed to him that *primâ facie* the section meant that when the right to supply electricity was given to the Company, one of the terms of the bargain was that they were not to do so beyond the specified area, otherwise than under the authority of Parliament or under a Licence from the Board of Trade. It was said that the word "undertakers" should be limited to the persons exercising powers within the district. His Lordship thought this would be a very strained construction. The word must mean the persons who were named and who had come to Parliament for powers. He could well understand the Legislature thinking that when there were to be separate districts with their self-contained generating stations it was desirable that the companies should not set up a non-statutory trade by agreement outside their districts. He was unable to construe the prohibitory words of section 5 otherwise than as Mr. Justice Farwell had done. For the reasons given by him, which he (his Lordship) had ventured to endorse, he thought the Company had bargained for limited rights upon the condition that they should not supply electricity outside their area; and he could not find in the Company's later Act of 1898 anything which by implication negatived the prohibition in section 5 of the Act of 1889. He was forced to give to the words of this prohibition their natural meaning.

Lord Justice VAUGHAN WILLIAMS agreed that the Act of 1898 could not be construed as having done away with the prohibition.

Lord Justice STIRLING was of the same opinion, and said he could not usefully add anything to what had been stated.

Mr. CRIPPS asked that the injunction might be suspended with a view to an appeal to the House of Lords.

Their LORDSHIPS granted a suspension except in Willesden.

A Costly Heap of Rubbish at Bath.—At the Bath County Court a few days ago, before his Honour Judge Gwynne James, an action was brought against the Bath Gas Company to recover £30 damages for injuries received through their alleged negligence in leaving a heap of rubbish and stones in The Close. Mr. Adam Wilks, the plaintiff, was stated to have badly hurt his foot in consequence of the presence of this obstruction; and after a lengthy hearing, his Honour gave judgment for him—assessing the damages at £15.

A Dispute as to the Supply of Incandescent Mantles.—At the Birmingham Assizes last week, Mr. Justice Jelf and a Special Jury tried an action brought by the Ramie Company, Limited, against the Dewey Lighting Syndicate, Limited, to recover £291, balance alleged to be due for goods sold. The claim was in respect of a large number of incandescent mantles; and the delivery of them was not disputed. It was, however, contended by the defendants that they were not furnished with the particular kind that they ordered, although no complaint was made of the quality of those supplied. They said they asked for "70-needle" mantles, whereas they received "90-needle" ones. They could not be returned because they had on them the name of the defendants. The plaintiffs argued that the "90-needle" mantles were furnished strictly in accordance with the terms of the contract. After a hearing extending over two days, the Jury, without leaving the box, found for the plaintiffs, and judgment was entered for them for the amount claimed—stay of execution being refused.

MISCELLANEOUS NEWS.

LONDON COUNTY COUNCIL AND THE GAS QUESTION.

The Proceedings on the London Gas Bills.

At the Meeting of the London County Council to-day, the Parliamentary Committee will present the following report on the result of the proceedings in Parliament on the London Gas Bills, a full account of which was commenced in the last issue of the "JOURNAL," and is concluded to-day.

We report that the Council's and the Joint Gas Companies' Bills have been considered by a Committee of the House of Commons presided over by Mr. Cawley. Sir Ralph Littler, K.C., Mr. Freeman, K.C., and Mr. J. G. Talbot appeared on behalf of the Council's Bill and in opposition to the Companies' Bill. After four days' discussion, the Committee passed the preamble of the Council's Bill, and rejected that of the Companies. The points on which the Council's Bill was modified were: (1) The question of reducing the standard price by a penny; (2) the suspension of the forfeitures in respect of sulphur impurity; (3) the testing for illuminating power in a case of deficiency was altered so as to be, as the purity test now is, taken on an average of three days, instead of on one day as at present.

With regard to the first point, after discussion with Counsel, and on their advice, it was thought well to strike out the clause, as Counsel thought there was no real support in the report of the Departmental Committee; and this was done. On the second point, the Committee decided to follow the report and abolish the sulphur tests for forfeitures. On the third point, the Chairman suggested that the illuminating power should be tested in the same way as the purity is at present (on a three-day average), and a provision to this effect was inserted, but with the test the Council sought to introduce, and regarded as the most important part of the Bill—viz., testing at 5 cubic feet per hour flow. The Committee also inserted the clause for which the Council asked, rendering the Companies liable to a penalty of £50 a day in the event of their disregarding various provisions of their Acts, which it has hitherto been found almost impossible to enforce. Other useful minor amendments of the existing law, including the whole of the provisions of the Council's Bill which were withdrawn last session, were also passed exactly as introduced. The Council have therefore succeeded, in the First House at all events, in passing practically the whole of their measure, covering points which have been the subject of very great controversy for several years.

We report that a Committee of the House of Commons presided over by Mr. Cawley considered the South Suburban Gas Bill. In the result, the Company withdrew their proposal for a reduction of illuminating power from 15 to 13 candles, and the alteration of the testing provisions. The abolition of forfeitures for sulphur impurities was allowed; Counsel for the Council stating that, while they objected in principle, they felt bound by the report of the Departmental Committee and the decision arrived at on the other Gas Bills. A proposal to allow a margin of half-a-candle deficiency in illuminating power before any penalty was incurred was, on the Council's opposition, refused by the Committee. The Council will, no doubt, regard this result as very satisfactory.

The South Metropolitan Gas Bill was considered by the same Committee as the Council's and the Gaslight and Coke, South Metropolitan, and Commercial Gas Companies' Bills. Part II. of the Bill, which seeks to abolish the office of the Gas Referees, and to make statutory the tests for the gas of the three Companies, was rejected by the Committee. In Part III., a clause applying the London Building Acts was acceded to by the Company.

GERMAN CONTINENTAL GAS COMPANY.

Annual Report and Accounts.

We have received, through Herr W. von Oechelhaeuser, the General Manager, a copy of the annual report and accounts of the German Continental Gas Company, which were submitted to the proprietors at the fiftieth annual general meeting of the Company on Friday last. We give below, as in former years, a summary of the contents of these documents.

The Company celebrated on the 12th inst. the fiftieth anniversary of its foundation, and reference has already been made thereto in the "JOURNAL" (*ante*, pp. 696 and 766). The past year has otherwise been a notable one in the history of the Company, because a new concession for the supply of gas to the town of Warsaw until July 1, 1941, was concluded and confirmed by the Tsar on June 6 last. Warsaw accounts for more than half the present output of the Company, so that it is very satisfactory that this business has been secured to it for a further long term. Several other concessions to the Company were renewed or granted in the course of the past year—viz., for the supply of gas in the towns of Luckenwalde up to Dec. 31, 1923, Rheydt up to Dec. 31, 1922, Odenkirchen up to Dec. 31, 1929, Oranienbaum (near Dessau), up to June 30, 1945, Alten (near Dessau) up to Dec. 31, 1935, and Giesenkirchen (near Rheydt) up to Sept. 15, 1944. While the report has been in the press, a prolongation of the existing concession from the town of Dessau, giving the Company the right to supply both gas and electricity there up to the close of 1935, has been secured. The concessions extended or arranged during the year will be equivalent to 64½ per cent. of the present business of the Company; so that it will be realized that its fiftieth year has been signalized by the obtaining of security of the continuance of the major part of its business for many years. On the whole, renewals have been secured since 1898 for 82 per cent. of the Company's output.

The construction of a second gas-works for Ruhrort has been started, and should be completed by the autumn. The old gas-works there, which were built in 1858, had become inadequate to meet the growing demands of the district. The new works will ultimately have a productive capacity of about 3½ million cubic feet per diem. A small electricity works was erected at Eckesey, and brought into operation on Aug. 15 last.

The total output of gas from the Company's works was 0·67 per cent. less than in the preceding year; but it must be remembered that the supply of the town of M.-Gladbach had been ceded to the Municipality at the beginning of the year. In the face of this loss of custom, and of the depression in Warsaw in consequence of the Russo-Japanese war, it is highly satisfactory that the decrease of output was not greater. The consumption for heating and power purposes was 22·21 per cent. of the total output, and the unaccounted-for gas 4·61 per cent.; the remainder being consumed for lighting and on the works. The total length of mains in use also showed a slight decrease.

The profit for the year amounted to 3,369,828·47 marks (about £163,098), which was an increase of 4·2 per cent. on the profit for 1903. This improvement was mainly due to better prices being obtained for coke and ammonia. The profit would have been still greater, but for the excessively low state of the Elbe and the Oder, which hindered the supply of English coal, and necessitated more costly inland coal being substituted for some of it. A dividend was recommended at the rate of 10 per cent. per annum, as in 1903; and a sum of 1,250,000 marks is contributed to the renewal fund. The balance carried forward is 164,366 54 marks (about £7979), which is more than usual; but in view of the disturbed condition of affairs at Warsaw, it is anticipated that extra expenditure is likely to be incurred there in the current year.

Experimental settings of vertical retorts have been tried, according to the design of the Company's Chemist, Dr. Bueb; and it is hoped that favourable results therefrom may be published this year. On March 21 last year, the Dessau Vertical Retort Company was founded for the exploitation of this system of retorts at home and abroad. Arrangements are being made for extensions of offices and chemical works at Warsaw, and for building new gas-works at Neumühl and Frankfurt-on-Oder, for which purposes the general meeting was to be asked to approve a further issue of 4 per cent. bonds redeemable at par in fifty years, or at 105 per cent. earlier. It is likely that an increase of share capital may become necessary this year. It was also proposed that the general meeting should vote a contribution of 150,000 marks to the special reserve fund for the Company's staff, by way of commemorating its jubilee.

THE PROPOSED WATER-GAS PLANT FOR DEVONPORT.

Discussion in the Town Council.

A Special Meeting of the Devonport Town Council was held on Tuesday last—the MAYOR (Mr. E. Blackall) presiding—for the consideration of the Gas Committee's recommendation that the tender of Messrs. S. Cutler and Sons of £4875 for carburetted water-gas plant be accepted. The matter had given rise to wide difference of opinion in Committee, and a voluminous report was presented to the Council, in which conflicting opinions were expressed as to the merits of the carburetted and the "blue" water-gas systems. A long abstract of this report was published in the "JOURNAL" for the 14th inst. (p. 718). It embodied a recommendation by Alderman W. Hornbrook and Councillor H. Jarvis (two members of a deputation) in favour of the carburetted system; and by Mr. C. Goodman (another member of the deputation), Messrs. Stevenson and Burstal (the Consulting Gas Engineers to the Corporation), and Mr. Sidney E. Stevenson (the Corporation Gas Engineer) in support of "blue" water gas.

Alderman HORNBROOK, in moving that the tender of Messrs. S. Cutler and Sons be accepted, said the deputation reported to a Sub-Committee, and six out of eight members were in favour of carburetted water gas. Then, after months had passed away, the matter came before the Gas Commtttee. Out of sixteen members, ten were at the meeting, and every one of them voted for it. Before the deputation went on its journey, it was said in the Council that they need go no farther than Plymouth, where they had the best installation of water gas in the kingdom. They were not in a position then to adopt this statement. They went and saw and heard for themselves. They went first to Birmingham; but the system there did not impress them as being so good as others they saw, and the Engineer told them there had been a few trifling accidents. One of the reasons why he was in favour of Messrs. Cutler and Sons' tender was because that firm's patent interlocking gear made it impossible for such accidents to happen. The chief recommendation, however, was that it was the lowest tender. They next went to West Bromwich, where they had the "blue" water-gas system in use. In answer to a question as to the cost of production, the Engineer said it was from 11d. to 11⅛d. per 1000 cubic feet. Mr. Stevenson, their Gas Engineer, said in his report that the answer was 10d., and Messrs. Stevenson and Burstal told them that the price was 9d. Was it 9d., 10d., or 11d.? It would be interesting to know. At Smethwick, they had a repetition of what they had seen at Birmingham. At Hornsey they inspected an installation, which commended itself to them because of what he had already pointed out. At Plymouth, Sir Joseph Bellamy (the Chairman of the Gas Company) said the plant erected by Messrs. Cutler and Sons at the works had gone well from the start. After it had been in operation for three months, the Company ordered two more sets. In conversation with himself, Sir Joseph told him that the Directors of the Company went pretty well everywhere, and saw plant of different kinds, and were satisfied that they had the best system of gas manufacture that there was anywhere. It was testimony like this which guided and influenced him (Mr. Hornbrook) more than anything else. The latest instance with which he was acquainted was that of Rochdale, where the Gas Committee had unanimously decided to recommend the Council to put down plant for the manufacture of carburetted water gas. The whole of the arguments of Mr. Goodman and the Engineers against the carburetted system might be reduced under the heads of: (1) Want of space, (2) higher relative cost of building, (3) nuisance arising from manufacture of carburetted water gas, and (4) higher relative cost of the gas. Practically the same space was wanted for both systems; while as to cost, the report showed that the carburetted water-gas plant which they recommended would cost £5147. As to the question of nuisance, they had letters from about thirty towns which showed that few complaints had arisen from this system of gas manufacture. Now he came to the question of the cost of the gas. An engineer near London, discussing this matter with him a month ago, said the cost at his works came out at just over 1s. 2d. per 1000 cubic feet, but that it ought not to cost Devonport more than 1s. In another town he (Mr. Hornbrook) examined the working sheets, and the cost there came to only 10d. per 1000 cubic feet. In the report by the Engineer and Mr. Goodman, the cost of carburetted water gas was said to be not less than 1s. 3d. He had shown that it was being made for 10d.; and there was no reason why it should not be manufactured as cheaply in Devonport.

Mr. H. JARVIS, in seconding the motion, denied the suggestion that the report signed by himself and Mr. Hornbrook was drawn up by an engineer. He thought Mr. Hornbrook had treated the blue water gas very leniently, after what they were told during their visit. Only at West Bromwich was the Engineer in favour of this system. At present it was only in the experimental stage; and engineers strongly recommended them not to adopt it.

Mr. C. GOODMAN, the minority member of the deputation, in the course of a lengthy speech, referred to Sir George Livesey's views on the subject of carburetted water gas, and quoted from the "JOURNAL;" his object being to show that what the Chairman of the Gas Committee advocated was not the best thing for Devonport. He was not there to boom any system; but between the different systems of water gas, he believed the Dellwik to be the best. His fear was that they might find themselves in conflict with the Admiralty and others for causing a nuisance. The gas-works were close to Government property; and if any nuisance arose, they would soon hear of it. In July, 1902, the Council endorsed a resolution of the Gas Committee in which the scheme of Messrs. Stevenson and Burstal for the extension of the gas-works was approved and instructions given for the preparation of the necessary plans and specifications. This resolution had not been rescinded, as it ought to be before they adopted a new scheme.

Mr. F. PAUL, who was also a member of the deputation, said the fact that there were over 200 installations of carburetted water gas in this country, and that its use was advocated by men of the highest reputation in the gas world, was sufficient evidence of its advantages. Blue water gas had been installed at only eight small works, whose united make was not more than that of one of the towns using the carburetted system. If blue water gas was the better, why had the engineers of the large works not adopted it? The question of space no longer existed; the gas experts and the Committee being agreed that there was sufficient room for either system. It was true that the Gas Committee advised the Council to ignore the advice of their experts. They did the same in respect to the gasholder; and he believed they were right in that instance. In the matter of the purifiers, the late Gas Company called in an expert, and got an estimate for £5500. Before the work was carried out, the concern came into the possession of the Corporation; and then it was suggested that there should be enlargements and additions, with the result that the cost came in the end to £10,956. This work was done by the firm whom the experts advised should put in the water-gas plant. Their retort-houses wanted rebuilding; and in the meantime the make of gas must be kept up. What the Committee recommended was the best way out of the difficulty. The Corporation had spent £40,000, which was not bringing them a penny in return; and until they had a water-gas plant, and could remodel the retort-house, they could not get anything out of this expenditure.

Alderman LITTLETON said that as their Gas Manager's tongue was tied, and as the Consulting Engineers were not allowed to be present, they had to listen to the opinions of gentlemen who were "heaven-born engineers" who had had nothing to do with gas-works until within the last year or two. Mr. Hornbrook had told them that the tender of Messrs. Cutler and Sons was the lowest; but, as a matter of fact, the lowest was that of the Economical Gas Apparatus Company. According to the Engineers' latest calculations, carburetted water-gas plant would cost £12,000, as against £8000 for straight water gas; and then they had spent £400 on a carburettor which would be useless if they adopted the recommended system. As to nuisance, the Admiralty, who could not interfere with them now, would watch them with a jealous eye; and the Engineers' reports which the Council had before them would be evidence against them in a Court of Law. The time had come when either the Engineers or the Chairman of the Committee must go. It had been said that the cost of the purifiers had been doubled; but the fact was that the purifying plant was much enlarged beyond the original design, and if they had to do the work again to-day, they would not get it at the same price. It behoved the Gas Committee to watch over their capital expenditure. They had borrowing powers to the extent of £100,000. Already they had spent £40,152; and they had still to rebuild the retort-house, and to carry out other works, the cost of which would involve an expenditure of £9950 in excess of their powers. The Gas Committee ought to bring up a report showing exactly the financial position, and what they proposed to spend. If they were going to trust people who were not experts to spend the money, they ought to know how it was going to be done.

Mr. TOZER moved, as an amendment, that the acceptance of Messrs. Cutler and Sons' tender be deferred for twelve months. He said it was for the Council to decide whether they would take the advice of men who had been in the gas business all their lives or that of men who had come in contact with it lately. The statements of the Engineers had been challenged; but it showed cowardice on the part of the Committee not to allow them to be present to answer for themselves. His advice to the Council was to hold their hands until they had the exact facts before them. Why did not the Chairman of the Gas Committee give them the figures which Alderman Littleton had laid before them as to the capital expenditure? Why did he not tell them that in twelve months the demand for gas would be 20 per cent. less than now?

Mr. A. STROUD seconded the amendment, and said they were advised by the Town Clerk that, if they refused to be guided by their Engineers, they would be clearly liable for any litigation which might ensue. The Admiralty now took one-sixth of their supply—50 million cubic feet—but in less than twelve months most of this demand would cease. They were pressing forward with the electricity works at the Dockyard; and in a year or so everything would be in operation. When the Admiralty demand ceased, they could effect any alteration they pleased in the construction of the retort-house, without providing additional plant.

Alderman WAYCOTT, as a former Director of the late Gas Company, said he was much concerned about the extraordinary amount of money which the Corporation were committed to spend in addition to the original cost of the undertaking to the town. They had come to the point where it was necessary to ask if they were well advised. His own opinion was they were very extravagantly advised. When the Company went to Parliament for power to borrow £100,000, they did not anticipate spending more than £25,000 of this amount in the immediate future. The Company had as much as they could do to pay their maximum dividend. He was in sympathy with the Committee, and did not blame them at all. The Engineers had anticipated an extension of the demand for gas, which to his mind was unreasonable. He strongly appealed to the Council to stay their hand. If they did not, they would transform that which might have been a profit-earning business into a heavy monetary incumbrance.

Mr. R. D. MONK remarked that, though they had many speeches, there was an utter absence of evidence of the need of water-gas plant. They were burdening the works with an enormous amount of capital which would not cheapen production.

Mr. M. FREDMAN agreed with those who said there was no evidence to support the demand for a departure from the present system. The cost of gas at the Devonport works to-day was 1s. 8½d. per 1000 cubic feet; but if they "put their house in order," they could reduce it to 1s. 4½d. They had spent £50,000 on which not a penny of dividend had been earned. It was an object-lesson on municipal trading.

The Council having sat four hours, decided to adjourn; it being understood that another special meeting will be called for the further consideration of the subject.

Messrs. Stevenson and Burstal, in a letter to one of the local papers, state that they never recommended the erection of purifiers and a purifying-house at a cost of £5500. They say:—

A contract for certain purifiers, amounting to about £5500, was let by the Gas Company a short time before the Purchase Bill of the Corporation and the Bill of the Company for extension of powers came on for hearing before a Committee of Parliament. During the hearing, an agreement was arrived at between the Corporation and the Company; one of the conditions being that the Company should not spend any more money on capital account without the consent of the Corporation. As it was impossible for the Company to erect the purifiers without the necessary foundations and building, the contract was held in abeyance until the Corporation acquired the works. The purifiers in use by the Company were of so small a capacity that it was incumbent upon the Corporation to erect new and much larger purifiers at the earliest possible moment; and these were taken in hand immediately on the scheme for the new works being formulated, and were to be erected as forming part of such scheme. Having in view the somewhat limited area of the ground, we advised that the contract should be varied by making each of the six purifiers of the same size, and by having the oxide storage and revivifying floor placed over the purifiers, and apparatus for conveying the spent oxide put in. Upon inquiry, we found that a considerable portion of the castings had been made, and other work constructed; and that a part had been actually delivered at Devonport. Naturally, the cost of the apparatus was increased in consequence of these additions. It was also further increased in consequence of the delay which took place causing loss to the contractors' laying out of their money; and taking into consideration all these matters, the price paid was not excessive.

We trust we have made it perfectly clear that we did not estimate for, or advise, the erection of purifiers, as stated at the Council meeting; but it is correct that we did advise additions to a contract already let, which increased the expenditure, and which we considered were necessary if our scheme for new works were carried out.

PERTH CORPORATION GAS SUPPLY.

Proposed Reduction in the Illuminating Power.

It may possibly be remembered that our Scotch Correspondent, in his "Notes" in the "JOURNAL" for the 14th inst., stated that, on the suggestion of the Convener of the Gas Committee of the Perth Corporation (Mr. J. Cuthbert), the Engineer and Manager (Mr. W. B. M'Lusky) had been instructed to consider and report upon the question of reducing the illuminating power of the gas. The report was presented to the Committee at their meeting on Monday last week, and unanimously adopted; and it was resolved to recommend to the Council in its terms. The following is an abstract of the document.

In order to arrive at a clear issue as to whether or not the proposed change would be a distinct advantage to the consumer and in the interests of the Gas Department and the community generally, Mr. M'Lusky went over the working costs of manufacture for the past ten years. In the calculations he has made, he has dealt with the subject entirely from the consumers' point of view; keeping in mind that the guiding principle in a progressive gas undertaking must always be the production of gas which will give the consumer the maximum lighting efficiency for his money. Coming to the question submitted to him, he refers to the action of the Glasgow Corporation in reducing the illuminating power of the gas from 25 to 20 candles in 1882, and states that the lower standard was adopted on the strength of arguments adduced by the then Gas Engineer, the late Mr. William Foulis, ten years before the advent of the Welsbach mantle. The 20-candle standard was maintained till the 2nd inst., when, exercising the powers that were obtained from Parliament in 1901, the Corporation resolved to reduce it to 16 candles in two stages. As Mr. Foulis enjoyed the confidence and esteem of the Perth Corporation, Mr. M'Lusky quotes from his report showing why Parliament should fix the standard at 16 candles. The chief reasons assigned were the increasing difficulty experienced in getting sufficient cannel coal to maintain a 20-candle standard, the extended employment of gas for household purposes, and the use of incandescent lighting. Mr. M'Lusky deals at some length with the question of the scarcity of the richer kinds of raw material for gas making, and shows that while these have increased in price, the commoner cannels and coals have not varied to any great extent. The result has been that the principal towns in Scotland have resorted to the use of these coals in order to be independent of a fluctuating market, and have sought to have a standard of illuminating quality which could be maintained from year to year, and avoid the disturbing effect on their business of an increase in the price of gas. As a consequence of this action, the standard prescribed by Parliament for the eight principal towns in Scotland is as follows: Aberdeen, Edinburgh, Leith, and Perth, 20 candles; Glasgow and Paisley, 16 candles; Dundee and Greenock, 15 candles. The average illuminating power supplied in the eight towns is 20·7 candles.

Mr. M'Lusky next gives some tabulated statistics to show the development of the gas business of the Corporation during the past ten years. They make it abundantly clear that while the sale of gas has increased by 94 per cent., the amount of gas-rental collected has only gone up to the extent of 54½ per cent. This is explained to be due to the reduction of working costs and increased receipts from residual products. The large increase in the consumption of gas recorded is not due, Mr. M'Lusky remarks, so much to the growth of the city or to the expansion of its trade, as to the application of gas to a variety of industrial and domestic purposes, and especially to the great development of the gas-stove business and the employment of gas-engines. The incandescent burner has also popularized the use of gas. Ten years ago this appliance was a luxury; now it is the prevailing lighting agent. The percentage of consumers using incandescent burners in business premises in Perth is 82, and for domestic lighting 65; while 18 per cent. use ordinary burners for the former and 35 per cent. for the latter purpose. The figures cited by Mr. M'Lusky show, as he points out to the Committee, that the proposed change in the standard of illuminating power would be "welcomed by the majority of the consumers, as it would ensure greater efficiency at less cost." A few appropriate observations are made on burners, to show that an unsuitable one will destroy illuminating power, and reduce 25-candle gas to the value of 22 candles only; whereas a good burner will enhance the light-giving value of the gas, while reducing the consumption by from 30 to 40 per cent. There is another, and most important aspect of the question, which, as Mr. M'Lusky observes, it is of interest to consider—viz., that every candle power of light produced by means of cannel coal costs the consumer three times the amount he would require to pay for an equal quantity of light produced from ordinary gas coal; and in times of temporarily increased demand, as shown in the report, the price of cannel has been raised as much as £1 per ton within a period of three months, while ordinary gas coal had not advanced 5s. Under these circumstances, the Gas Committee have often found themselves in a position of extreme difficulty. The necessary quantity of cannel could not be purchased without putting up the selling price of gas to an abnormal figure; and consequently it has been found necessary from time to time to temporarily reduce the candle power. This is a most unsatisfactory condition of things for the consumer, the Committee, and for all concerned in the prosperity of the Gas Department. "What the consumers want," Mr. M'Lusky says, in concluding his report, "is a regular and uniform supply, suitable for their requirements in all respects and at all times; and if the 20-candle standard were adopted, the Committee would be in a position to guarantee a uniform, and in every respect satisfactory, supply of gas, without the risk of an advance in price in the event of any unexpected increase in the cost of a particular coal or class of coal, for they would have a large variety of coal from which to select their supplies, and the purchase would be made on more favourable terms than is possible at present."

GAS EXHIBITION AT SOUTHPORT.

An exhibition of gas appliances on a large scale, in connection with the Southport Corporation Gas Department, was opened in the Cambridge Hall, Lord Street, last Tuesday, by the Mayor (Mr. E. Trounson), who was formerly Chairman of the Gas Committee. Lights varying from 300 to 1000 candle power were shown; and a special feature of the exhibition was a model bedroom and bathroom, in which was demonstrated the different methods of illumination and heating. Among the firms exhibiting were Messrs. Fletcher, Russell, and Co., Limited, John Wright and Eagle Range, Limited, and the Richmond Gas Stove and Meter Company, Limited, who showed every variety of cooker; Messrs. Sawer and Purves, of Manchester, and a host of local exhibitors; while West's Gas Improvement Company, Limited, had on view a model of a regenerative retort setting and hot-coke conveyor, also their patent coke-conveyor. Various kinds of gas meters, burners, and fittings were on show, in addition to samples of sulphate of ammonia and other residual products from the Crowlands Gas-Works, Southport. Lamps for both public and private lighting, and fittings for hot-water apparatus, baths, &c., were shown on a large scale. The whole exhibition and the quality of the light called forth repeated expressions of approval. The arrangements were under the supervision of Mr. John Bond, the Corporation Gas Engineer, who had on view numerous appliances used in the production of coal gas. There was a large attendance at the opening ceremony; those present, in addition to the Mayor, including Alderman Travis (the Chairman of the Gas Committee), several members of the Corporation, and Mr. Bond. Alderman Travis briefly explained the object of the exhibition, and said the Mayor took great interest in the gas estate of the Corporation, having been Chairman of the Committee for many years. They owed much to him in the way of the development of the undertaking, and they looked for still further progress. The Mayor followed with some interesting historical and statistical particulars in regard to the gas industry of the country, and

said those who were connected with it were greatly indebted to the inventor of the incandescent burner; and he thought the visitors would see as good an example of this system of lighting as it had been his lot to witness in any of the Provinces. He emphasized the importance of doing away with the flat-flame burner. The incandescent burner would give more than eight times the light when used with low-pressure gas, and an even greater efficiency with a higher pressure. The whole of the streets of Southport were lit with incandescent gas. He considered gas-cookers did not get the attention they deserved. The Corporation had about 4700 of them out on hire; and the increased consumption of gas arising from hiring stoves last year was 14½ million cubic feet. In a town he had recently visited, an example was set which he thought they would do well to follow in Southport; and he trusted the Gas Committee would do so. One day a week had been set apart for the purpose of enabling the ratepayers to view the works which the Corporation owned. If they presented themselves to Mr. Bond at the Crowland Gas-Works, they would spend a very pleasant time, and be exceedingly interested in the process of gas manufacture. The object of the exhibition was to increase the sale of gas in the town; and therefore it ought to appeal to the ratepayers, for the rates had been relieved to the extent of scores of thousands of pounds. Another object of the exhibition was that the people might be taught how to burn gas in the most up-to-date fashion. He then declared the exhibition open. A hearty vote of thanks having been accorded to the Mayor, afternoon tea was served in his parlour. The exhibition, which was largely visited throughout the day, will remain open untill to-morrow (Wednesday); practical cookery lessons being given twice daily by the Misses Birkett and Wilkinson.

TORPOINT WATER SUPPLY.

Agreement with the Admiralty and the War Office.

As the result of negotiations which have taken place between the Admiralty, the Secretary of State for War, and the Torpoint Urban District Council, an agreement in regard to carrying out the new water scheme for which the Council are asking for parliamentary powers has been concluded. The Admiralty agree to pay 10-26ths of the costs and expenses incurred by the Council in the promotion of the Bill, including legal, surveying, and engineering costs and expenses. The Council undertake to complete the works within eighteen months after the Bill has received the Royal Assent, and provide the conveniences necessary to receive, store, and distribute not less than 500,000 gallons of water a day. The Council will also lay down a line of pipes from their nearest main to Penlee Battery, the pipes to be the property of the Secretary of State for War, and not to be employed for the supply of water to the public without his consent. The expense of laying the pipes will be paid by the Secretary, provided that the amount payable by the War Office under the clause should not exceed £1500. The Council agree to supply to the Admiralty and the Secretary of State for War such water as they shall require. The Admiralty are not, without the consent of the Council, to be entitled to require more than 135,000 gallons per day, or the Secretary more than 3000 gallons per day, on the average taken over a quarter of a year. Whenever the Admiralty and the War Department require for a short period an increased supply, the Council are, if reasonably possible, to furnish it. The Admiralty and the War Department agree to pay for the supply in every year, by equal quarterly instalments, as follows: Admiralty, £1000; Secretary for War, £300. Provision is also made that the Admiralty and the War Department on the one hand, and the Council on the other, may from time to time after the expiration of a period of five years from the date upon which the Council begin to afford their supply, require the terms of payment to be revised; and in that case the sum to be paid is to be settled, failing agreement, by arbitration. Until the expiration of the period sanctioned by Parliament for the repayment of loans under the Bill, the Admiralty and War Department undertake to pay by quarterly instalments for such supply as they require (with a minimum of 100,000 gallons per day) at the price agreed upon; and they are to be entitled, in addition, free of charge, to any surplus water derived from the works authorized by the Bill which would otherwise flow to waste. The agreement also provides that, in the event of there being any default on the part of the Council in giving the full supply of water, or of the water supply being affected by impurity, all payments to the Council are to cease while the default or impurity continues; and if it lasts more than seven consecutive days, the Council are under an obligation to pay, by way of liquidated damages, £3 per day to the Admiralty and £1 per day to the Secretary of State for War. Other clauses provide for the proper pressure of the water supplied, for the position of meters, for the retention of Mr. James Diggle for the construction of the works contemplated by the Bill, and for the assignment of the benefits and obligations under the agreement from one to the other of the Departments mentioned, or to any other Government department.

Fatal Accident at the Newport (I.W.) Gas-Works.—A man at the Newport Gas-Works has met with his death through falling off a moveable ladder about 12 feet long, which he had often used before. When giving evidence at the Coroner's inquiry, the Manager (Mr. H. J. Ibbotson) said the ladder referred to was a heavy wooden one, standing in the yard, which had been made use of for a long time past by the workmen engaged about the place. They preferred this ladder to a vertical iron one which was bolted to the wall, because they thought it much safer and easier to get up. He had not heard of the ladder having fallen down; and if it had done so, it must have been seen. To his knowledge there had been no other accident caused by using the wooden ladder. The Deputy-Coroner, in summing up, said he did not think they could do anything else but accept the statement that deceased was going up the ladder, and coming over queer happened to fall off. It seemed perfectly clear that death resulted from an accident, for which nobody was to blame. The Jury returned a verdict of "Accidental death."

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Now that the Western District of the Scottish Junior Gas Association have finished their first season's work, it is possible to form a better idea as to the value to be placed on the services of the new body. As to this there can only be but one opinion. The Junior Gas Association have made a name for themselves in the short period of six months which would have been creditable to them had they taken nearly as many years to yield the same production. An excellent list of papers was got through in the course of the session. It may, in fact, be admitted that the strength of the District lay in its capacity to produce papers. The debating power has not been so marked. We could not look for much else in a Junior Association, one of whose objects is to train the members to ready utterance as well as to right thinking. The discussions will improve with time; in the matter of papers, no improvement need be looked for, because of the excellence of those which have been already given, and also of the fact that on the principle of "first come best served," the most interesting subjects have already been dealt with. The resolution of the Council to publish the papers which have been read before the District must, in any event, have been recognized as a commendable one; but in the circumstance of the great preponderance, in the matter of quality, of the papers, the commendation is all the more deserved. Some of the papers the book will contain will be valuable to students for reference, particularly those by Mr. A. Smith, Mr. C. Fairweather, Mr. J. Bell, and the present one by Mr. Whitelaw; and the reference will be all the more useful in that the members heard the papers read and discussed, and that the information given is the result of personal work by their own colleagues. In this movement of the Junior Association, it is undoubted that the end has abundantly justified the means. A most valuable mass of information has been set free, for general use, which would have, but for the Association, been retained in the bosoms of a few. The generous spirit in which this has been communicated deserves to be acknowledged. The movement has been well guided, and gives promise of being a continuing benefit to those in whose interests it was founded.

The Gas Committee of the Corporation of Perth have agreed, promptly and unanimously, to the proposal to reduce the illuminating power of the gas supplied to the city. A perusal of the report by Mr. W. B. M'Lusky, the Engineer and Manager (an abstract of which appears elsewhere), will satisfy most people that no other course was open to the Committee, if they wished to do their duty to the community. The report is full of facts so set forth, and of reasons so well stated, that it irresistibly carries conviction with it. A word of explanation may be given as to what is proposed to be done, as it was not necessary to make it clear in the report. The Corporation are at present empowered to supply gas of 20-candle quality, but have been giving 25 candles. The proposal is to bring the illuminating power down to the existing authorized standard; so that no legislative suction is required to enable the step which is contemplated to be taken. Should the Council adopt the minute of the Gas Committee (which there is every reason to believe they will, it having been unanimous), the change in the illuminating power can be made at once; and the benefit of it will be experienced in the purchase of coal for the year which will shortly commence.

In the Aberdeen Town Council on Monday, Mr. Allan asked what methods were adopted to safeguard the interests of gas consumers. Mr. Kemp, the Convener of the Gas Committee, replied that the meters were tested and verified by the manufacturers before leaving their works, and were again tested on their arrival in Aberdeen. Before they were sent out to customers, they were once more examined and tested, and afterwards, on the special application of a consumer, they were re-verified. It was thus apparent that every precaution was taken to secure the reliability of the meters; and it was not surprising to learn that few complaints were made against them. Only about term time, as a rule, did consumers evince a desire to suspect their meters; and if they wished to have them tested, the Corporation removed them to the Weights and Measures Department, where a careful examination was made. The number of meters dealt with at that period of the year was usually from 20 to 30. For the privilege of having his meter tested, the consumer had to pay a small fee, generally varying from 6d. to 1s.; and he received a certificate that the meter had been examined. Should any defect be discovered, the amount which the consumer had been overcharged was carefully assessed, and was struck off his account; and the fee which he had paid was returned. This careful reply warded off further agitation on the subject. It may be mentioned that there are about 35,000 gas consumers in Aberdeen. Having got his answer, Mr. Allan gave notice of a motion to have remitted to the Gas and Electricity Committee to take the same steps for independently testing the electricity indicators and meters as are in force in regard to gas-meters, and also to consider the advisability of reducing the amount of deposit required before a consumer can have his indicator or meter tested.

A Parliamentary Commission has been sitting in Edinburgh this week considering applications under the Private Legislation Procedure (Scotland) Act, 1899. One of the applications was that which is known as the Esk Valley Power Gas, in which authority is being sought to form a Company for the erection of works and the supply of power gas in the parishes of Penicuik, Lasswade, and Cockpen, in Midlothian, as well as the working up of residual products. The promoters, before the sitting of the Commission, came to terms with all their opponents; so the measure will be reported to Parliament as unopposed. It is understood that the venture is intended chiefly to be for the benefit of paper-mills, of which there are a large number in the district.

In the Glasgow Sheriff Court on Thursday, John Wilson, a young man, was brought up on a charge of having on three occasions uttered counterfeit receipts, by means of which he obtained from officials in the Gas Department of the Corporation sums of money which had been lodged as gas deposits by householders in the city. He pleaded guilty. It was stated on his behalf that the accused was of respectable parentage, and had given the long period of fourteen years' service to the city in the Gas Department. He was receiving only £85 a year. His brother

had come forward and had paid to the Corporation the sums that the accused had obtained wrongfully. The brother had also undertaken that the accused would be sent out of the country, to start life afresh under new conditions. Sheriff Scott Moncrieff sent the accused to prison for three months, the sentence to run from the arrest.

The vigilance of certain members of the Corporation of Dundee is untiring; and if it were in all cases wisely directed, it would be invaluable. An illustration of how affairs in the Corporation Gas Department are watched was given at a meeting of the Gas Committee on Tuesday, when Mr. Mathers called the attention of the Committee to cases of dismissal of men who had given long service at the gas-works. He thought some consideration should be shown to such men. It was explained by Mr. A. Yuill, the Manager, that it was customary at the beginning of the summer to dispense with the services of a number of the workers; and the subject dropped. There this incident ended; but two days later there was an inquiry before the Sheriff and a Jury into the circumstances attending the death of an old man who was employed in the gas-works, which throws a suggestive light upon this subject. The man, Alexander Clark by name, was 72 years of age, and slightly deaf. He was employed as a labourer, and one day was knocked down by a locomotive engine in the works, sustaining injuries of which he died. The driver of the engine was asked if he sounded the whistle on that occasion. The Town Clerk objected to the question, and gave as his reason that if the witness were to answer "Yes," he would subject himself to a charge of culpable homicide. And on being told by the Sheriff that he need not answer the question unless he liked, he declined to reply. A formal verdict was returned, to the effect that Clark was fatally injured by being knocked down by an engine. It is, of course, greatly to be regretted that men get old, and stiff, and deaf; but so long as this order of things prevails, it will surely be conceded that the retention of such men in gas-works is scarcely correct policy. The Corporation of Dundee were prepared to deal with these men on generous terms; but some of their number who are professedly friends of the working classes were the occasion of legal opinion being obtained to the effect that their action was illegal. The Council then resolved to give light employment to old men. One such man has been killed, who ought not to have been there; and yet, knowing all this, a councillor endeavoured to make out a grievance to the workers in the dismissal of old men. There is a cross-purpose somewhere here. There are apparently too many would-be managers for the management of the Dundee Gas-Works to be altogether so satisfactory as it might.

It is a pity that so much should be heard about the quality of the gas supplied in Edinburgh and Leith; but when the subject is brought up in a public body, it is necessary that it should appear here too. It was before the Town Council on Tuesday. Mr. W. W. Macfarlane is the latest leader of the complaining section of the community. When the report as to the illuminating power of the gas was submitted, he wanted to know the reason for the discrepancy between the candle power at Granton—24·97—and at New Street (the disused gas-works in Edinburgh) 20·9. Was it because of the greater distance the gas had to travel? Several gentlemen essayed to answer. Mr. A. A. Murray remarked that it was a well-known scientific fact that the further gas travelled the more it deteriorated. Bailie Menzies said the gas was very much above the quality they were bound to make, and that Mr. Macfarlane's light would be greatly improved if he would take the advice of the Gas Engineer and put in incandescent burners. Mr. Macfarlane objected to the Gas Engineer dictating to him what he should use. Mr. Balfour said there was a motion coming before the Commission in favour of lowering the quality of the gas; and if they were going to lower it, what sort of light would it be? Mr. Maxton pointed out that they were only bound to manufacture gas of 20-candle power at the works, and were not bound to supply it at a particular standard other than that at the works at Granton. Lord Provost Sir Robert Cranston said he did not believe that this was the intention of the Act. He would raise the question at the Gas Commission, and he asked Mr. Macfarlane to lodge a representation in writing to him there. There was a good deal more jargon uttered; and then the subject dropped, without its being made clear that anything was done, except that it is to be brought before the Gas Commission by the Lord Provost.

At a later stage of the Council meeting, Bailie M'Michael asked leave, on behalf of the Cleaning and Lighting Committee, to take back their report for further consideration. The Committee recommended that 1950 street gas-lamps should be converted from flat-flame into incandescent lamps, at an initial cost of £4022, and a permanent annual increase of £888 in cost. The Committee, it was said, now wished to recommend that the whole of the city should be lighted by incandescent lamps. Mr. Stevenson asked that a definite statement should be given of the cost of the conversion and upkeep of the lamps. If this were done, the Electric Lighting Committee would know where they were. Mr. Leishman said he should like to know if they were to get a lower price for the gas used with incandescent burners than with flat-flame burners, or if the Gas Commissioners were to instal incandescent burners, and then to raise the price to anything they liked. Mr. A. A. Murray suggested that a small Committee should be appointed to draw up an examination paper for Gas Commissioners. The subject was re-committed; but the discussion was not of the most intelligent order, and the suggestion might be made, in view of some of the random statements, whether it would not be advisable to institute examinations for town councillors. Seeing that the Gas Commissioners are drawn from the ranks of councillors, this is an instance in which the greater would include the less; and it is notorious that it is the greater, and not the lesser body, which invariably displays a most lamentable ignorance upon subjects connected with lighting.

Reduction in Price at Louth.—The Louth Gas Company announce a reduction in price of 2d. per 1000 cubic feet as from the end of last month. This is the second reduction of 2d. within a year, and brings the price down to 3s. 10d. per 1000 cubic feet, or, after deducting the cash discount of 15 per cent., to about 3s. 3d. net.

Hitchin Urban Council and the Gas Company.—The Hitchin Gas Company have written declining the offer of the Urban District Council to buy the undertaking for £33,250; adding that the works are not for sale. They further express astonishment at the Council's proposal, seeing that no complaint has been made as to the gas supply.

Armagh Gas Company.—The annual meeting of this Company was held on Monday last week, under the presidency of Mr. W. J. Best, J.P. It appeared from the statement of accounts presented that the profit on the revenue account was £1337. The total amount derived from the sale of gas was £5032, while the receipts in respect of residual products were £1767. The report was adopted, and a dividend of 1s. 9d. per share was declared.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 834.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p.c.	21—22	..	4 15 5
100,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	Nov. 11	6½	Bombay, Ltd.. . .	6½—6¾	..	4 16 4
140,000	5	,,	6½	Do. New, £4 paid	4¾—5¼	..	4 19 1
50,000	10	Mch. 15	14	Bourne-) 10 p.c. . . mouth Gas) B 7 p.c. . and Water) Pref. 6 p.c.	29½—30½*	..	4 11 10
251,810	10	,,	7		16½—17½*	..	4 0 0
53,200	10	,,	6		15½—16½*	..	3 12 9
380,000	Stk.	Feb. 24	12	Brentford Consolidated	245—250	..	4 16 0
300,000	,,	,,	9	Do. New . . .	18½—190	..	4 14 9
50,000	,,	,,	5	Do. 5 p.c. Pref. .	127—132	..	3 15 9
206,250	,,	Dec. 15	4	Do. 4 p.c. Deb. .	105—108	..	3 14 1
220,000	Stk.	Mch. 15	11	Brighton & Hove Orig.	223—228*	..	4 16 6
246,320	,,	,,	8	Do. A. Ord. Stk. .	165—170*	..	4 14 2
460,000	20	Sept. 29	10	British	41¾—42½	..	4 14 1
100,000	Stk.	Feb. 24	6	Bromley, Ord. 5 p.c. .	118—123	..	4 17 7
165,700	,,	,,	4½	Do. do. 3½ p.c. .	90—94	..	4 15 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	12½—13	..	5 7 8
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
150,000	20	Mch. 15	8¼	Cagliari, Ltd.	25—27*	..	6 2 3
100,000	10	Sept. 29	10	Cape Town & Dis., Ltd.	16¾—17½	+¼	5 15 11
100,000	10	Oct. 27	4½	Do. 4½ p c Pref.. .	9¾—10¼	..	4 7 10
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,400,000	Stk.	Feb. 24	5 5/16	Commercial 4 p.c Stk. .	116—119	..	4 7 4
560,000	,,	,,	5	Do. 3½ p.c. do. .	112—115	..	4 6 11
450,000	,,	Dec. 15	3	Do. 3 p.c. Deb. Stk.	86—88	..	3 8 2
800,000	Stk.	,,	6½	Continental Union, Ltd.	113—116	−2	5 12 1
200,000	,,	,,	7	Do. 7 p c Pref.	140—145	..	4 16 7
424,070	Stk.	Feb. 18	5½	Derby Con. Stk. . . .	—	..	—
55,000	,,	Jan. 3	4	Do. Deb. Stk. . . .	108—110	..	3 12 9
486,650	10	Jan. 27	11	European, Ltd. . . .	21½—22½	..	4 17 9
354,060	10	,,	11	Do. £7 10s. paid	14½—15½	..	5 6 6
15,243,200	Stk.	Feb. 10	4 1/16	Gas-) 4 p.c. Ord. . . light) 3½ p.c. max. . . and) 4 p.c. Con. Pref. Coke) 3 p.c. Con. Deb.	93—100	..	4 8 0
2,600,000	,,	,,	3½		92—94	..	3 14 6
3,799,735	,,	,,	4		112—114	..	3 10 2
4,193,975	,,	Dec. 15	3		93—92	..	3 5 3
258,740	Stk.	Mch. 15	5	Hastings & St. L. 3½ p.c.	100—103*	..	4 17 1
70,000	10	Sept. 29	11	Hongkong & China, Ltd.	16—17	..	6 9 5
3,800,000	Stk.	Nov. 11	10	Imperial Continental .	217—220	+1	4 10 11
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Mch. 15	6	Lea Bridge Ord. 5 p.c. .	118—123*	..	4 17 7
561,000	Stk.	Feb. 24	10	Liverpool United A . .	221—223	..	4 9 8
718,100	,,	,,	7	Do. do. B . .	162½—164½	+2½	4 5 1

Issue.	Share.	When Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
306,083	Stk.	Dec. 30	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	Dec. 15	5	Malta & Medn., Ltd. .	4—4½	..	5 11 1
560,000	100	Oct. 1	5	Met. of) 5 p.c. Deb..	103—105	..	4 15 3
250,000	100	,,	4½	Melbourne) 4½ p.c. Deb.	103—105	..	4 5 9
541,920	20	Nov. 11	3½	Monte Video, Ltd. . .	11—12	..	5 16 8
1,565,892	Stk.	Feb. 24	4½	Newc'tle & G'tesh'd Con.	107—108	+½	4 5 8
406,625	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	92—93	..	3 15 3
15,000	10	Feb. 24	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	1/	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	Nov. 30	8	Oriental, Ltd. . . .	148—151	..	5 6 0
600,000	5	Sept. 15	7	Ottoman, Ltd. . . .	6—6½	..	5 12 0
235,005	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6½	Primitiva Ord. . . .	6—6½	−¼	4 12 4
796,980	5	Jan. 27	5	Do. 5 p.c. Pref. .	4¾—5¼	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
851,070	10	Oct. 13	7	River Plate Ord. . . .	13—13¼	+¼	5 3 8
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	96—98	..	4 1 8
250,000	10	Sept. 15	7†	San Paulo, Ltd. . . .	12½—13	+¼	5 7 8
70,000	50	Jan. 3	5	Do. 5 p.c. Deb. .	52—54	..	4 12 7
135,000	Stk.	Mar. 15	10	Sheffield A	234—236*	+1	4 4 9
209,984	,,	,,	10	Do. B	233—235*	+1	4 5 1
523,498	,,	,,	10	Do. C	233—235*	+2	4 5 1
123,998	Stk.	Sept. 29	5	Shrewsbury Ord. 5 p.c.	104½—107½	..	4 13 0
70,000	10	,,	11	South African	16—17	..	6 9 5
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	129—131	..	4 4 0
1,832,700	,,	Jan. 13	3	Do. 3 p.c. Deb.	89—91	..	3 5 11
575,000	Stk.	Feb. 24	5½	S'th Suburb'n Ord. 5 p.c.	120—123	..	4 9 5
60,000	,,	,,	5	Do. 5 p.c. Pref. . .	122—127	..	3 18 9
112,533	,,	Jan. 13	5	Do. 5 p.c. Deb. Stk.	130—135	..	3 14 1
502,310	Stk.	Nov. 11	5	Southampton Ord. . .	107—110	..	4 10 11
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Feb. 24	6½	Tottenham) A 5 p.c. . and) B 3½ p.c. .	125—128	..	4 17 8
338,720	,,	,,	4½		97—100	..	4 15 0
125,000	,,	Dec. 15	4	Edmonton) 4 p.c. Deb.	107—110	..	3 12 9
182,380	10	,,	8	Tuscan, Ltd.	9½—10	..	8 0 0
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Feb. 24	7½	Wands-) A 5 p.c. . worth) B 3½ p.c. . and) C 3½ p.c. .	163—168	..	4 12 3
255,636	,,	,,	6½		135—140	..	4 9 3
60,000	,,	,,	5 27/40		111—113	..	4 16 0
57,564	,,	Dec. 30	3	Putney) 3 p.c. Deb. Stk.	82—87	..	3 9 0
745,872	,,	Mch. 15	5	West Ham 5 p.c. Ord. .	102—104*	..	4 16 2
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	123—126*	..	3 19 4
193,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—110	..	3 12 9

Prices marked * are Ex div. † Next dividend will be at this rate.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 25.

Sulphate of Ammonia.

Although there has been more inquiry and a fair amount of business passing, the efforts of the large buyers have been mainly directed to bringing about a further decline, and prices have consequently barely been maintained. The closing quotations are £12 13s. 9d. per ton f.o.b. Hull, £12 15s. per ton f.o.b. Liverpool, and £12 16s. 3d. per ton f.o.b. Leith. Home demand has been the most satisfactory feature in the situation; the Continent, notwithstanding the strong nitrate of soda market, being for the most part indifferent about sulphate of ammonia. In the forward position there has not been much interest, although speculative offers continue to be made abroad at a discount on spot prices.

Nitrate of Soda.

In sympathy with the advance at Continental ports, local prices have been put up to 11s. 1½d. and 11s. 4½d. per cwt., for ordinary and refined qualities, respectively.

LONDON, *March* 27.

Tar Products.

The market during the past week has been decidedly quiet, and there has been an absence of demand. Benzol is easier all round. Business is reported in London at 9½d.; while in the North some quantity was sold at 8¾d. for early shipment. In 50-90 per cent., there is still a fairly good inquiry for forward delivery; but consumers are not willing to pay the prices asked by makers, so that business does not result. In toluol, there is nothing fresh to advise. Makers appear well sold for early delivery; and as regards forward, they prefer waiting rather than reduce quotations. As for solvent, there is certainly more offering in the North of England, where makers appear rather anxious to sell for early delivery. In London. the market is also quiet, and there is no business of importance to report. The demand for home consumption is scarcely so good as usual at this time of year, and there is certainly more offering than was the case a little while ago. There is no business doing in anthracene, although it is reported that a low offer for a considerable quantity of "A" quality 40-45 per cent. was declined by one of the principal manufacturers here. In carbolic acid, there is still a limited business doing in crude; but prices are, if anything, a trifle easier. Sales have again been made at 1s. 9½d. in London, but 1s. 9¼d. was accepted in the North for March-April delivery; while consumers now only offer 1s. 9d. for early shipment, and seem indifferent as to the last six months of the year. In crystals, there is still a fairly good inquiry, but very low prices have been again accepted for 39-40 per cent. for prompt delivery. The London market continues fairly steady in creosote; and the largest makers, being well sold, do not seem inclined to reduce their quotations. A little business has been done in Yorkshire, but low prices have been accepted; while as regards the Manchester and Liverpool districts, there are sellers at 1 15/16d. But consumers will not pay this price, and do not seem at all anxious for early delivery. It would appear that the future of the market depends entirely upon the American demand, which it is hoped will improve in the course of the next month or two when arrangements for delivery are more complete. The market in pitch continues to fall slightly in value, although the labour troubles in Belgium are now at an end, and fuel makers have, as a rule, resumed work. So far as London is concerned, the largest producers are well sold for early delivery, and they do not appear very anxious to sell forward. There is no doubt, however, that there will be some quantities available for May-June; while as regards September-December, there does not at present appear to have been any business of importance done. On the East Coast, sales have been made at from 30s. to 31s., according to make and position of shipping port. Liverpool and Manchester are undoubtedly the weakest markets; and makers in these districts appear certainly anxious to sell for April shipment, being evidently desirous of clearing out stocks before the hot weather sets in. As regards South Wales, the demand seems to have ceased for early delivery, although there are several inquiries in the market over the last six months of the present year.

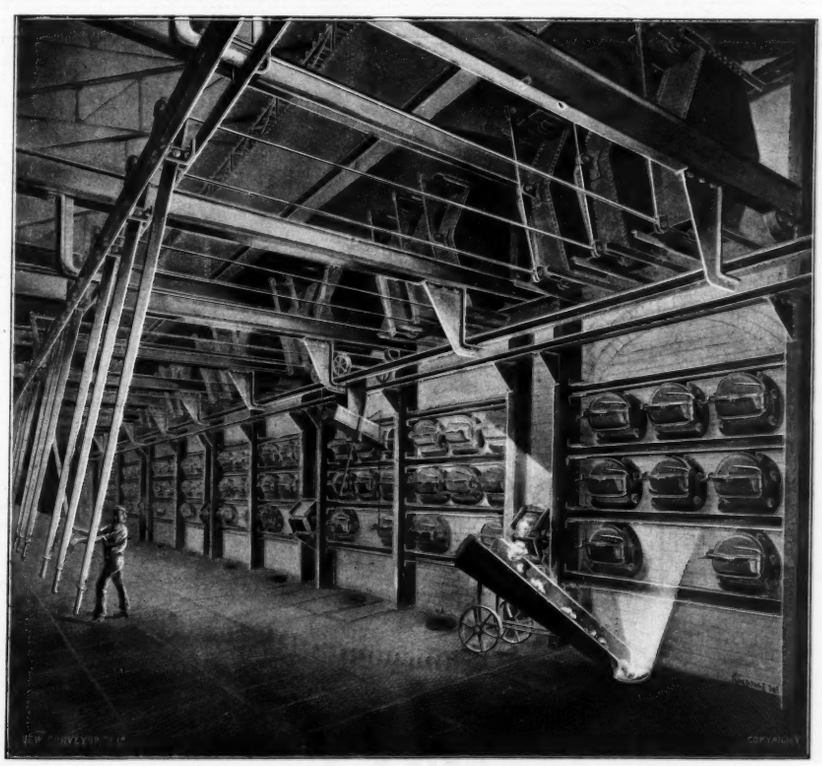
The average values during the week were: Tar, 18s. to 22s. Pitch, London, 32s. to 32s. 6d.; east coast, 30s.; west coast, 29s. to 29s. 6d. Benzol, 90 per cent., 9d. to 9½d.; 50-90 per cent., 7½d. Toluol, 7½d. to 7¾d. Crude naphtha, 3d.; solvent naphtha, 8d. to 8½d.; heavy naphtha, 9½d. to 10d. Creosote, London, 1⅞d. to 1 15/16d.; North, 1½d. Heavy oils, 2d. to 2 1/16d. Carbolic acid, 60 per cent., 1s. 9½d. to 1s. 9¾d. Refined naphthalene, £4 to £8; salts, 16s. to 17s. 6d. Anthracene, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market has been very quiet during the week, and closes with an absence of business. At Beckton the nominal price still remains £12 17s. 6d.; but no business is possible at this. The South Metropolitan Company quote £13 to £13 1s. 3d., but are unable to realize this. At Hull, early in the week, business was done at £12 13s. 9d. to £12 15s.; but £12 12s. 6d. may be taken as the closing value, at which price there are one or two small parcels now offering. In Leith, the price is still nominally £12 15s.; but there does not appear to be any business doing even at this figure. Liverpool is quiet; and there are sellers at £12 13s. 9d. to £12 15s. for early delivery.

Brading Water Supply.—The Local Government Board have declined to grant an application made by the Rural District Council of Brading for a loan of £3000 to supply the town with water from the mains of the Isle of Wight Water-Works Company.

No Drawing Stage required.



Hot Coke Fed to Producer.

WRITE FOR ESTIMATES.

PATENT "DWARF" INCLINED BENCH.

NEW CONVEYOR CO., LTD., SMETHWICK.

COAL TRADE REPORTS.

Lancashire Coal Trade.

Millowners who have renewed their contracts for engine fuel at the increased price of 5d. per ton, which came into operation a few weeks ago, have acted wisely. Owing to the small demand, comparatively speaking, for house coal, less slack is being made; and it is not unlikely there will be a further advance in the price of engine coal. At present, the demand continues firm. Practically, slack is taken away as fast as it is made. With regard to gas coal, deliveries have decreased in quantity; but users are renewing their contracts at last year's prices. Coal for shipping goes on steady. There is no alteration to report in prices, which continue on the basis of last week's quotations in all departments. There has been a better demand for coke during the last few days.

Northern Coal Trade.

There is a slight change for the better in the coal trade of the North-East, in consequence probably of the approach of the period for the shipments to the Baltic. Best Northumbrian steams are about 9s. per ton f.o.b., second-class steams are 8s., and steam smalls are rather scarce at about 5s. In the gas coal trade, there are now rather slower deliveries, the consumption having in some measure decreased; and the price is easy at from 7s. 9d. to 8s. 6d. per ton f.o.b. for Durham descriptions, according to quality. The contracts for the great southern gas companies are now in course of negotiation; and for one of the series of contracts, a considerable part of the coal has been secured at prices that are believed to be from 7s. 6d. to 8s. per ton f.o.b.—or substantially the same rates as those that have been paid under the contracts that are now running out. Coke is steady; and gas coke is without change this month.

Scotch Coal Trade.

The coal market shows no signs of improving. Shipping orders are scarce; and the home demand is not sufficient to take up all the output, with the consequence that there is broken time in many collieries, and stocks are accumulating. The prices quoted are: Main 7s. 3d. to 7s. 6d. per ton f.o.b. Glasgow, ell 7s. 9d. to 8s. 9d., and splint 8s. 3d. to 8s. 9d. The shipments for the week amounted to 189,176 tons—an increase of 12,380 tons on the previous week, but a decrease of 32,962 tons upon the corresponding week of last year. For the year to date, the total shipments have been 2,312,041 tons—an increase of 324,568 tons upon the same period of 1904.

The Worthing Gas Company have placed a repeat order with Messrs. Robert Dempster and Sons, Limited, of Elland, for Waddell's regenerators.

TRADE NOTES.

Additional Water-Gas Plant for Smethwick.

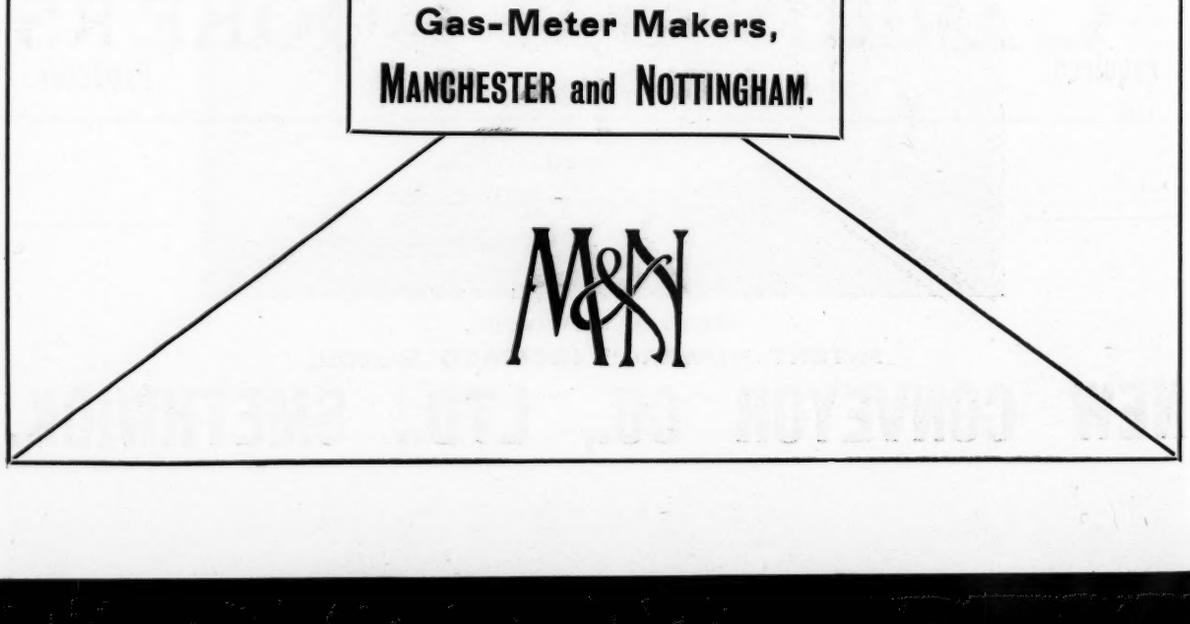
At the meeting of the Smethwick Town Council last Tuesday, it was decided, on the recommendation of the Gas Committee, to accept the tender of the Economical Gas Apparatus Construction Company, Limited, for the supply and erection of a set of carburetted and "blue" water-gas apparatus for £2700. This is the second installation of water-gas plant at the works.

The Fiddes-Aldridge Retort-Stoking Machines.

We are informed that, following on the introduction and continued successful working of the Fiddes-Aldridge "Simultaneous" retort-stoking machine at the Treforest Gas-Works of the Pontypridd Urban District Council, similar machines are now being built for installation at the Canons' Marsh works of the Bristol Gas Company, and the Wavertree works of the Liverpool United Gas Company.

East Cowes Water Supply.—A Local Government Board inquiry has been held by Mr. P. M. Crosthwaite into an application by the East Cowes Urban District Council for sanction to borrow £7000 for the purpose of providing an improved water supply for the district. It was mentioned that there had been a considerable increase in the consumption of water in the town, due mostly to the Royal Naval College being opened at Osborne and the growing population.

New Water-Works for Todmorden.—In the presence of a large attendance of the public of Todmorden and representatives of neighbouring public bodies, Alderman E. Lord, the Chairman of the Water Committee of the Todmorden Corporation, last Thursday turned on the water at the new water-works at Gorpley, about three miles from the town. Mr. G. F. Deacon, M.Inst.C.E., has been the Engineer for the scheme. The reservoir, which has a capacity of 130 million gallons, will provide a daily supply of 621,000 gallons, exclusive of compensation water. The estimates of mean rainfall within the watershed of the reservoir have been on the safe side; and this led the Engineer to express the view that Todmorden will probably never require a second reservoir, which was originally intended, and was sanctioned by the Act of 1898. If this turns out to be the case, the ultimate cost of the reservoir works will be little, if any, more than half the authorized expenditure for the purpose. Mr. J. H. Parkin was Resident Engineer of the works; and the Contractor was Mr. B. Lumb, of Todmorden—his contract being for £49,413. The land cost about £8000; the Water Act, £4500; and the existing pipes within the borough, £18,000. Altogether, the total cost of the new works, which were commenced on May 31, 1900, will probably be upwards of £90,000. The Mayor of Todmorden (Alderman Jackson), in the course of the proceedings, unveiled a bronze tablet in the water-tower; and a banquet was given at the Todmorden Town Hall by the Chairman of the Water Committee.



Progress of the Torquay Gas Company.—A report of a very gratifying character was presented at the annual meeting of the Torquay Gas Company on Thursday. Notwithstanding the mild weather of the latter part of the year, and the competition of the electricity undertaking, the sale of gas continues to increase, and the demand for its use for cooking and heating makes most satisfactory progress. The number of new consumers during the year was 66 ordinary and 134 prepayment; while 237 additional stoves had been let out on hire. The sale of gas increased by nearly 2 million cubic feet, partly stimulated no doubt by the reduction of the price last year. This reduction represented a loss of revenue of £1500; but the actual receipts (£33,822) were only £50 less. At the same time, the expenditure had been reduced, so that the net result was a gain on profit and loss account of £634. Mr. Kitson, the Chairman of the Company, announced that the price of gas would be further reduced to 2s. 11d. per 1000 cubic feet, the lowest price in the history of the undertaking; and that prepayment consumers would be allowed rebate of 1d. in the shilling, and the services of officials and workmen recognized by payment of a bonus. In the course of the discussion, Mr. J. Young complained of the extravagance in the lighting of the streets, and said they were throwing away £20 a year on each of the arc lamps. Mr. J. F. Rockhey, the Chairman of the Finance Committee of the Town Council, challenged the statement that the Corporation were extravagant. Mr. Kitson replied that no doubt the members had a desire to study economy; but, as a matter of fact, they did not produce it, while the Company did.

Rangoon Water Supply.—Sir Hugh Barnes, the Lieutenant-Governor of Burma, on the 22nd ult. performed the opening ceremony at the Hlawga Water-Works. The first works were opened by Sir Rivers Thompson in 1878, when the population of Rangoon was only 100,000; it has now risen to just under 300,000. There were extensions in 1883 and 1894; but the supply had nevertheless become inadequate for the increasing demands of the city. The present extension comprises the forming of a reservoir at Hlawga, with a capacity of 13,951 million gallons, of which 13,304 millions are estimated to be above sluice level. The previous capacity was relatively small, being only 904 million gallons. The catchment area of the Hlawga Lake is now about nine square miles, the surface of the lake being 3040 acres. Of the water stored above lowest sluice level, it is estimated that 6000 million gallons will suffice, at 25 gallons per head per day, for the dry season requirements of 650,000 persons; leaving a stand-by volume of upwards of 7000 million gallons as a reserve for years in which the rainfall during the wet season is deficient. The total length of the dams is 18,806 feet, with an average height of 35 feet above bed level. There are two escape weirs, each 125 feet long, at the north end of the lake, and a discharge sluice at the south. Including the laying of an extensive system of water-mains, the cost of the entire scheme will probably work out at 80 lakhs of rupees, or close upon £800,000. This compares very favourably with the Tansa Lake scheme at Bombay, which cost the latter Municipality about 150 lakhs, only affording a storage capacity about equal to that of Hlawga.

Penzance Water Supply.—The Penzance Town Council have decided, on the recommendation of the Sanitary Committee, to apply to the Local Government Board for sanction to borrow £4500 for the purpose of relaying the water-mains. Mr. Matthews, in moving the adoption of the report containing the recommendation, said it had been felt for many years that the supply of water to the higher districts of the town was inadquate.

Fatal Accident at the Guildford Gas-Works.—An inquest has just been held at Guildford on the body of a stoker at the gas-works, named William Timms, who died as the result of an accident. Deceased mounted a ladder in the boiler-house to turn a tap in order to fill the boilers with water; a special spanner being provided for the purpose. On being questioned after the accident, he said that the spanner slipped off the nut, and with the shaking of his body the ladder moved, and he fell off. Medical evidence was to the effect that deceased had several fractured ribs, and was at the time suffering from bronchitis. He subsequently developed pneumonia, and died eight days after the accident. Death was due to heart failure, following pleuro-pneumonia, consequent upon fractured ribs, the result of the accident. After a brief consultation, the Jury returned a verdict of "Accidental death;" and added a rider to the effect that the Gas Company should see that the tackle was properly fixed for this kind of work, both as regarded the tap and the ladder, and that they should not have moveable things which were constantly used for one particular purpose. On behalf of the Company, Mr. Barlow pointed out that everything had been passed by the Factory Inspector; but, of course, if it had occurred to anyone that an accident was likely to happen, the arrangements would have been altered.

Improvements at the Padiham Gas-Works.—At the last monthly meeting of the Padiham District Council, the Gas Manager (Mr. A. J. Harrison) submitted a report on the present condition of the gas-works, and suggested certain improvements whereby the manufacturing operations could be carried on more economically. The principal change will be in the retort-house, where it is proposed to erect two settings of six retorts, with full-depth regenerators, by which it is expected to produce 25 per cent. more gas per retort than is now made. The other advantages claimed for this system, compared with the shallow regenerators now in use at the works, are a reduction in labour, fewer retorts being required to produce the same quantity of gas; higher and more uniform heats, resulting in greater yield of gas per ton of coal carbonized; and less work in clinkering. The average production of gas per ton of coal for the years 1902-3-4 was 10,158 cubic feet; but with the full-depth regenerators, Mr. Harrison says an average production of 10,500 cubic feet per ton would undoubtedly result. With the proposed settings, he considers 96,000 cubic feet of gas per day could be relied upon, with less labour, wear and tear, &c. The cost of carrying out the changes is estimated as follows: Retorts, £340; valves, connections, &c., for condensers, £15; new lime-store, £20—total, £375. The Council agreed to the suggested work being proceeded with.

30

Sizes and Varieties.

'CARRON' GAS COOKERS

Carron Company
INCORPORATED BY ROYAL CHARTER 1773

Works: CARRON, STIRLINGSHIRE, N.B.

AGENCIES, SHOW-ROOMS AND DEPOTS:—

LONDON (City)—15, Upper Thames Street, E.C.; LONDON (West End)—23, Princes Street, Cavendish Square, W.; LIVERPOOL—30, Red Cross Street; MANCHESTER—24, Brazennose Street; BRISTOL—10, Victoria Street; NEWCASTLE-ON-TYNE—13, Prudhoe Street; GLASGOW—125, Buchanan Street; BIRMINGHAM—Guildhall Buildings; DUBLIN—44, Grafton Street; SOUTHAMPTON—Town Quay, The French Prison.

Large Water Consumption at Watford.—According to a report lately presented to the Watford Urban District Council by Mr. Charles Hawksley, there is great waste of water in the town. The present supply amounts, on an average of the year, to about 30½ gallons per head per day for domestic purposes, and to about 1½ gallons for public and trade uses, making a total of about 32 gallons for all purposes, whereas in a place like Watford 20 gallons per head per day should, he says, be ample on the average of the year, or, after making allowance for seasonable fluctuations (as in summer and in frost), 25 gallons as the maximum to be provided for on the average of a week of greatest demand. He thinks it is quite possible to suppress much of this waste by the adoption of suitable regulations. This opinion is shared by the Surveyor (Mr. D. Waterhouse); and the Council have instructed him to employ the necessary staff temporarily, to methodically examine and replace new water connections in those parts of the town where the old fittings exist.

Water-Works Extensions at Warwick.—Colonel A. G. Durnford has recently held an inquiry at Warwick relative to an application of the Warwick Town Council to the Local Government Board for power to borrow £11,500 for purposes of water supply, including the provision of a reservoir with a capacity of 500,000 gallons. It is proposed to sink a well at Woodloes, from which it is hoped to derive 150,000 gallons of water a day; and two 22-horse power gas-engines and two pumps will be provided. An 8-inch main is to be laid from the well to the nearest point of the existing mains. In acquiring the necessary land, the Council assented to a provision that if at any future time the owner of the land required water, he was to construct a reservoir, and they would pump the water into this reservoir, and he would pay all expenses. They were to pump into the reservoir water not exceeding 10,000 gallons a day; and the owner of the land was to pay for it. The scheme was opposed by Mr. Gold, who urged that the need for more water had been altogether exaggerated, and that the town was not in a position to bear the proposed burden. On the other hand, however, the Mayor, the Chairman of the Water Committee, and several other members of the Council maintained that an improved supply was urgently required.

Curious Effect of Sound on Light.—A correspondent of the "Ironmonger," signing himself "Puzzled," writes as follows in the current issue: "In our shop there are several gas-burners of different patterns, among them an imitation inverted burner burning with an ordinary cheap mantle. One evening recently I happened to be ringing a bicycle bell under this burner, and noticed that the light was immediately much improved. I tried the experiment repeatedly, with the same result every time, but could not detect any effect whatever on the other burners in the shop. I got the same result (on the same burner only) when ringing the bell at the other end of the shop. I then tried waving a hat underneath the burner, but without result, thus clearly proving that the phenomenon was due to the sound. The light reverts to its former state when the bell has ceased ringing. Those of my friends to whom I have mentioned the matter, who have not been round to see the experiment, advise me to sign the pledge. The explanation, I can assure you, does not lie in that direction. What, then, is it?" The Editor gives the following answer to the question: "In certain conditions, many atmospheric gas-flames are sensitive to sound —*i.e.*, are momentarily altered in shape, sometimes by any noise, sometimes by one or by only a few definite musical notes. In incandescent burners, the change in form causes the mantle momentarily to glow less or more brightly, and is occasionally a great nuisance. The usual cause is a deficiency in pressure at the injector-jets, as may be seen by manipulating the cock of (say) a Kern burner when a clock is striking. Perhaps a partial closure of the air-inlets may render our correspondent's burner insensitive; but as noise improves his light, it follows that the flame and mantle do not fit perfectly."

We have received the first number of "The Valve World." It is issued by the Crane Company of Chicago and Queen Victoria Street, E.C., and contains a brief history of the Company, which was started in 1855, and now commands a very extensive business. The contents are varied, and there are illustrations. It is intended to continue the publication monthly.

The Richmond Gas Stove and Meter Company, Limited, have entered the "Quaker" grate (Price and Webber's patent), of which they are manufacturers, in the competition for "Apparatus for the Utilization of Coke," promoted by the Société Technique de l'Industrie du Gaz en France. As mentioned in the "JOURNAL" a short time since, the Scciété are offering a prize of 5000 francs for the most effective coke grate.

A competition was organized by "Le Journal," one of the leading Paris daily papers, in connection with the "Women's Exhibition" now being held at the Grand Palais in the Champs Elysées. Among the prizes awarded are the following: £5 to MM. Parceint et Cie. for coal and gas cooking apparatus; £4 to MM. Briffault et Cie. for similar articles; £4 to the exhibitors of the "Telephos" apparatus for lighting gas-jets from a distance; and £2 for the "Auto-flamme" gas-lighting apparatus.

The outbreak of typhoid fever at Lincoln, which has now happily subsided, has caused attention to be directed to systems of sterilizing impure water supplies, especially those which do not involve the use of chemicals, which impart to the water a disagreeable taste. Among these may be mentioned the process of the Lawrence Patent Water Softener and Sterilizer Company, Limited, of Uxbridge Road, Notting Hill, who have just issued a new catalogue of their various manufactures, including an improved type of exhaust-steam softener and feed-water heater. The Company have recently completed plant for effectually sterilizing and re-aërating 90,000 gallons of typhoid-infected water per day.

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, Manager.
L. L. MERRIFIELD, M.Inst.M.E., Engineer.

London Offices: 19, ABINGDON STREET, WESTMINSTER, S.W.
American Offices: TORONTO. TELEGRAPHIC ADDRESS: "CARBURETED, LONDON."

CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND IN ADDITION, 7,000,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

The Rural District Council of Caistor have retained the services of Mr. E. J. Silcock, M.Inst.C.E., of Leeds, to prepare a scheme of water supply for the town.

The Directors of the Primitiva Gas and Electric Lighting Company of Buenos Ayres, Limited, recommend a dividend of 6 per cent. per annum on the ordinary shares for the past year.

The Directors of Sir William Arrol and Co., Limited, state in their report for the past year that the gross profits amounted to £38,901. After providing £5474 for depreciation and transferring £1672 to the reserve, it is recommended that a dividend at the rate of 10 per cent. per annum be paid on the ordinary shares; leaving a balance of £3631 to carry forward.

The Water and Gas Debenture and Share Investment Trust, Limited, has been registered with a capital of £2000, in £1 shares (1000 preference, 800 ordinary, and 200 founders'), to acquire and hold any stocks, bonds, debentures, shares, scrip, or securities of any water, gas, electric light, or illuminant undertaking, and to carry on the business of a financial and trust company.

The London Waterside Manufacturers' Association, the formation of which was noticed in the "JOURNAL" for the 7th ult. (p. 350), has been registered with 500 members, each liable for £5 in the event of winding up. The object, which is sufficiently indicated by the title, has already been explained. The word "Limited" is omitted from the title by licence of the Board of Trade. The management is vested in a Council.

Last Thursday week the registered plumbers under the jurisdiction of the Birmingham and District Council held their meeting, with the City Surveyor (Mr. John Price) in the chair. After the transaction of some formal business, Mr. E. Antony Lees (the Secretary of the Water Department) delivered a lecture on "The Elan Valley Water-Works," which was illustrated by lantern slides. A hearty vote of thanks was accorded the lecturer.

The Directors of Stewarts and Lloyds, Limited, report that the net profit for the past year, after setting aside £40,000 for depreciation, amounts to £142,960. Adding the balance brought forward, the total amount available is £196,099. They propose to place £25,000 to the reserve fund, and pay a dividend for the half year ended Dec. 31 at the rate of 11 per cent. per annum on the ordinary shares (making 10 per cent. for the year), free of income-tax; leaving £53,099 to be carried forward.

In an appreciative article on the results of the working of the Leicester Corporation Gas Department in the past year, as given in the "JOURNAL" last week (p. 701), the "Municipal Journal" refers to the share Mr. Alfred Colson had in their production, and adds: "In view of the resignations that have been lately taking place in municipal circles, we advise the Leicester Corporation to keep an eye on Mr. Colson. He is just the kind of man the South Metropolitan Gas Company, for instance, would like to get hold of; and he is just the kind of man, too, corporations need to keep in their service."

The Bournemouth Gas and Water Company, as will be seen by an announcement in our advertisement columns, are inviting tenders for an issue of 2000 "B" shares of £10 each. The minimum price of issue is £15 per share.

Mr. Tim Duxbury has been giving the members of a local Cricket Club a treat by showing them over the Oldham Gas-Works, of which he is Engineer. The inspection began at the point where the coal enters the works, and ended at the laboratory, where Mr. Fred. Chadderton read a short paper descriptive of the process of analyzing coal gas. At the conclusion of the visit, the Rev. J. F. Brown moved a hearty vote of thanks to Mr. Duxbury and Mr. Chadderton.

As gas has frequently to be conducted to places in workshops and other premises which cannot easily be reached by means of solid tubing, the attention of gas managers and fitters may be called to the new catalogue of the United Flexible Metallic Tubing Company, Limited, of Ponders End, whose effective stand at the Earl's Court Exhibition many of our readers may have noticed. They will find described in the pamphlet the various uses to which the tubing can be put.

At the meeting of Bruce Peebles and Co., Limited, next Friday, the Directors will report that the net profit on the past year's working amounted to £28,792. Adding the balance brought forward, the sum available for distribution is £29,146. After paying the year's dividend on the preference shares, amounting to £5707, the Directors recommend a dividend of 6 per cent. on the ordinary shares, less income-tax, the addition of £2879 to the preference shareholders' reserve fund, writing £4000 off preliminary expenses, and transferring £7000 to the general reserve fund. There will then remain a balance of £3854 to be carried forward. Owing to the increase in the Company's business, further capital is required; and the shareholders will therefore be asked to sanction the creation of 10,000 additional preference shares and a similar number of ordinary shares, all of £5 each, and to increase the borrowing powers to the extent of £50,000.

An exhibition of gas appliances, promoted by the Gas Committee of the Rotherham Corporation, and carried out under the supervision of the Gas Engineer (Mr. F. A. Winstanley), was opened in the Drill Hall, Rotherham, last Tuesday afternoon. The Chairman of the Gas Committee (Alderman Gummer, J.P.) presided; and the opening ceremony was performed by the Mayor (Colonel C. J. Stoddart, J.P.). Among the exhibitors were the Davis Gas-Stove Company, Limited, Messrs. Fletcher, Russell, and Co., Limited, John Wright and Eagle Range, Limited, the Richmond Gas Stove and Meter Company, Limited, the Carron Company, Limited, Messrs. Wilson and Mathiesons, Limited, the Pneumatic Gas Lighting Company, Limited, and the National Gas-Engine Company, Limited. The Pneumatic Company demonstrated the utility of their inventions by automatically lighting the lamps of the hall. Arrangements were made for the delivery of lectures on cookery by Mrs. Springthorpe during the period of the exhibition.

MILBOURNE'S

PATENT LUTELESS

PURIFIERS

SAVE

GAS, GROUND SPACE, & CONNECTIONS

ERECTED OR IN HAND AT THE FOLLOWING GAS-WORKS:

WREXHAM, DORKING, MITCHAM, RUGBY, EVESHAM, BOLOGNA (ITALY), SEDGELEY, VALPARAISO (CHILI), BANGOR (IRELAND), DRAYCOTT, BRITISH GAS COMPANY (ETRURIA STATION), STRATFORD-ON-AVON, KIDDERMINSTER, KETTERING, NORTH MIDDLESEX, &c., &c.

SOLE MAKERS—

C. & W. WALKER, LTD.,

Midland Iron Works:
DONNINGTON, NEWPORT, SALOP.

London Office:
110, CANNON STREET, E.C.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

ENGINEER AND MANAGER. Rotherham Gas Department. Applications by April 3.
REPRESENTATIVE (GAS PLANT MANUFACTURERS). No. 4365.
CARBONIZING AND WORKS FOREMAN. No. 4362.
CHIEF INSPECTOR. Wandsworth and Putney Gas Company. Applications by April 5.
FOREMAN. No. 4368.
FOREMAN. Londonderry Gas Company.
SERVICE LAYER, GAS-FITTER, AND METER INSPECTOR. Cudworth Gas Department. Applications by April 6.
COLLECTOR, &c. No. 4370.

Situations Wanted.

ALL-ROUND MAN. No. 4366.
GENERAL ASSISTANT. No. 4371.
INSTALLATION BUSINESS. No. 4369.
JUNIOR CLERK (GAS OR WATER COMPANY). Field, Upper Parkestone.
METER INSPECTOR. No. 4367.
OUTDOOR SUPERINTENDENT. No. 4348.
RETORT SETTER. G. R. S., Preston.

Plant, &c., Wanted.

CAST IRON PIPES AND SPECIALS. St. Mary Cray Gas-Works.

Plant, &c., for Sale.

PUMPING ENGINE, PUMPS, &c. Birmingham Water Department.
PURIFIERS, &c. Redditch Gas Company.
STATION METER, GOVERNOR, &c. Dumfries Gas Commissioners.
TOWER SCRUBBERS. Stourbridge Gas Company.

Stocks and Shares.

BOURNEMOUTH GAS AND WATER COMPANY. April 13.
CROYDON GAS COMPANY. April 3.
GREAT YARMOUTH WATER COMPANY. April 11.
ILFORD GAS COMPANY. April 11.
ROTARY METER COMPANY (PROSPECTUS). List closes March 29.
SOUTH ESSEX WATER COMPANY. April 11.

TENDERS FOR

Benzol.
WIGAN GAS DEPARTMENT. Tenders by April 17.

Coal.
COMMERCIAL GAS COMPANY. Tenders by March 30.
EDINBURGH AND LEITH GAS COMMISSIONERS. Tenders by April 10.
LIVERPOOL GAS COMPANY. Tenders by April 17.
STRETFORD GAS COMPANY. Tenders by April 5.

Gasholder.
MITCHAM AND WIMBLEDON GAS COMPANY. Tenders by April 18.

General Stores, Oils and Paints, Implements, and Castings, &c.
EDINBURGH AND LEITH GAS DEPARTMENT. Tenders by April 10.
WIGAN GAS DEPARTMENT. Tenders by April 17.

Lamps.
WIGAN GAS DEPARTMENT. Tenders by April 17.

Lime.
EDINBURGH AND LEITH GAS DEPARTMENT. Tenders by April 10.

Meters.
EDINBURGH AND LEITH GAS DEPARTMENT. Tenders by April 10.

Pipes and Specials, &c.
EDINBURGH AND LEITH GAS DEPARTMENT. Tenders by April 10.
WIGAN GAS DEPARTMENT. Tenders by April 17.

Sulphuric Acid.
WIGAN GAS DEPARTMENT. Tenders by April 17.

Tar and Liquor and Light Oil.
BRIDGEWATER COLLIERIES. Tenders by April 3.
CHELMSFORD GASLIGHT AND COKE COMPANY. Tenders by April 1.
WIGAN GAS DEPARTMENT. Tenders by April 17.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, the charge is 25s. a year.

Abroad (in the Postal Union): £1 7s. 6d., payable in Advance.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

OXIDE OF IRON.

O'NEILL'S OXIDE has a larger annual sale than all other Oxides combined.

SPENT OXIDE purchased in any district.

GAS PURIFICATION & CHEMICAL CO., LD.
JOHN WM. O'NEILL, Managing Director,
PALMERSTON HOUSE, LONDON, E.C.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO, LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

BIGGS, WALL, & CO., 13, Cross Street, Finsbury, E.C. *Telegrams:* "RAGOUT," LONDON. *Telephone:* 273 CENTRAL.
EXHAUSTING MACHINERY—See Advt. in last week's issue.
SATURATORS—See Advt. in this week's issue.
SULPHATE PLANTS—See Advt. in next week's issue.

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

THE KEITH LIGHT.
OVER 1600 INSTALLATIONS IN DAILY USE.
SEE illustrated advertisement in next week's issue.
JAMES KEITH AND BLACKMAN CO., LTD., 27, Farringdon Avenue, LONDON, E.C.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

DUTCH OXIDE OF IRON.
THE First Dutch Bog Ore Co., Ltd, (Eerste Hollandsche Yzererts Maaty), ROTTERDAM.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.
London Managers—
E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

GASHOLDER PAINTING.
PAINTING Work for all kinds of Gas- Works Plant undertaken by contract or otherwise.
FREDERICK BOYALL, 31, Regent's Row, Queen's Road, DALSTON, N.E. Established 1850.

SPENT OXIDE.
THE South Metropolitan Gas Company are always open to receive OFFERS of SPENT OXIDE.
Chief Office: 709, Old Kent Road, London, S.E.
Telegrams: "METROGAS, LONDON."

PATENTS AND TRADE MARKS
PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

"NUGEPE" GAS PLANT CEMENT.
JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

GLASS SHADES of every description, for all kinds of Interior GAS LIGHTING. Illustrated sheets on application.
JOHN WALSH WALSH,
SOHO AND VESTA GLASS WORKS, BIRMINGHAM.
Telegrams: "VESTA, BIRMINGHAM."
National Telephone: No. 63.
London Show-Room: 4, HOLBORN CIRCUS, E.C.

OXIDE OF IRON.
(NATURAL.)
BALE & CHURCH will be pleased to send Quotations and Samples on application.
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT for all Retort and Furnace work.
PAINT for Gasholders, Purifiers, &c.
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.
SPECIALLY prepared for the Manu- facture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, AND MESSEL, LIMITED, 36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341, AVENUE.

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

OXIDE OF IRON.
WESTBURY OXIDE is now being ex- tensively used for Gas Purification.
For Price and Analysis write to the NEW WESTBURY IRON COMPANY, LIMITED, WESTBURY, WILTS.

GAS TAR and AMMONIACAL LIQUOR wanted by
GEORGE MILLER AND CO., Tar Distillers,
40, West Nile Street, GLASGOW.

RETORT Setter wants Situation. Accustomed to Drawings, can take own dimensions of new work or repairs, or alterations, make Drawings, superintend the Erection of Retort-Benches and Iron-work and Retort-Houses complete. No objection to going abroad.
Address G. R. S., 52, Mona Terrace, Ashton, Preston, LANCS.

SITUATION wanted in a Gas-Works. Twenty Years' Experience in all Branches of the Manufacture and Distribution of Gas. Good Mechanic, Gas-Fitter, and Smith. Well up in Making and Repairing Gas Cookers, Fires, &c., Testing and Fixing Meters. Thoroughly Experienced Main and Service Layer up to any size. Good all-round man. First-class Testimonials. At liberty any time.
Address No. 4366, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OUTDOOR SUPERINTENDENT.
AN Energetic, Tactful Man, Age 35, who has for the last Ten Years successfully Managed a small Gas Undertaking, will shortly be free and prepared to take over a post as above. Well up in Main and Service Laying, General Gas-Fitting, able to advise on all matters connected with uses of Gas, prepare Estimates, and able to take Sole Charge of the Distribution Department. Moderate Salary.
Address No. 4348, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ROBERT DEMPSTER & SONS, Ltd., Contractor for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

JUNIOR Clerk (age 19) seeks Situation in Gas or Water Company's Office. 2½ years' Experience.
Address FIELD, Tennyson House, Layton Road East, Upper Parkstone, DORSET.

YOUNG man wishes to perfect himself practically in an Installation Business. Board and Lodging in the house. Could make himself useful in spare time by writing.
Address, No. 4369, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Meter In-SPECTOR by a thoroughly capable young Man. Age 27. Has had several years' Experience as Slot-Meter Collector and Inspector. Employers' References. Moderate Wages.
Address No. 4367, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as General ASSISTANT on a Gas-Works. Served articles with Gas Engineer and Manager. Good Carbonizer, Analyst, and Draughtsman, and a thorough all-round knowledge of the General Routine of a Gas-Works. Five Years' Experience. Salary moderate. Would make appointment.
Address No. 4371, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Suburban Gas Com-pany, a COLLECTOR with knowledge of Gas-Rental Work, who will be required to devote the whole of his time to the Company's work either outside or inside the Office.
Wages £2 per week. Guarantee will be required for £300; premium to be paid by the Gas Company.
Applications, stating Age, Experience, and References, to be addressed to No. 4370, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS-WORKS FOREMAN.

WANTED, in Scotland, for a Works making 140 Millions, a smart, reliable, FOREMAN. Must be Married, capable of controlling workmen, thoroughly steady, with an intimate knowledge of Regenerative Settings, Boilers, and Gas-Works machinery. Wages 46s. per week to commence.
Apply, stating Age, previous Experience, and giving References, to No. 4368, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

REPRESENTATIVE wanted by one of the largest Firms of Gas-Works Plant Manufacturers and General Constructional Engineers in Belfast or Dublin, Newcastle-on-Tyne, Birmingham, and Manchester Districts. Only those having a good Connection and Representing other reliable Firms need apply.
State names of other Firms represented and full Particulars of Experience and Ability to introduce Business to No. 4365, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LONDONDERRY GASLIGHT COMPANY.

GENERAL FOREMAN

WANTED by the above Company Must be good Carbonizer, accustomed to Inclined Retorts, Water-Gas Manufacture, Sulphate of Ammonia, and all usual Testing for Impurities, &c., and able to prepare all working cost. Good House, Coal, and Gas provided.
Apply, giving all Particulars and Wages required, to
R. J. SKINNER.
Manager and Secretary.
Lecky Road,
March 23, 1905.

CUDWORTH GAS AND WATER SUPPLY.

WANTED, by the Cudworth Urban District Council, a steady and competent man as SERVICE LAYER, METER and LAMP INSPECTOR, and GAS-FITTER (one used to Slot Installations and Collection preferred).
Applicants must also be qualified to repair Water-Mains, Service Pipes, and Fittings. Wages 35s. per week.
Particulars of Duties, &c., may be obtained from the undersigned.
Applications, in own handwriting, stating Age, Experience, and present Employment, when at liberty, and *copies* of Testimonials, to be sent to the undersigned not later than the 6th of April, 1905.
W. E. RALEY,
Clerk to the Council.
Barnsley, March 22, 1905.

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

CHIEF INSPECTOR REQUIRED.

WANTED by this Company a Chief INSPECTOR, with full Experience in all departments, to supervise under the direction of the Engineer, the whole of the Outdoor Work, Mains, Services, Ordinary and Automatic Installations, Stoves, Public and Private Lighting, &c., &c.
Salary £200 per annum.
Applications to be delivered to the undersigned, marked "Inspectorship," accompanied by Testimonials and giving fullest Particulars, Age, &c., by April 5.
By order,
CHAS. W. BRAINE,
Secretary.
North Street, Wandsworth, S.W.,
March 18, 1905.

CARBONIZING AND WORKS FOREMAN.

WANTED, immediately, an Ex-perienced Reliable Man as GENERAL CARBONIZING and WORKS FOREMAN, for a Works producing 500 Millions per Annum. Must understand all Machinery used in connection with Gas-Works, and have held a similar appointment. House, Coke, and Gas provided.
Apply, with not more than Three References, stating Experience, Age, and Wages required, to No. 4362, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COUNTY BOROUGH OF ROTHERHAM.

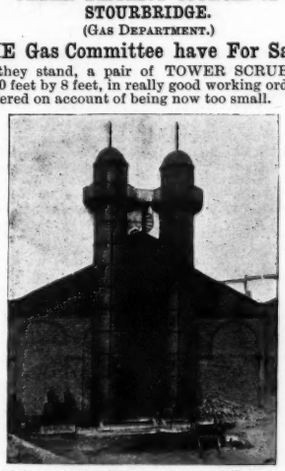
THE Corporation of Rotherham invite APPLICATIONS for the Appointment of ENGINEER and GENERAL MANAGER of the Rotherham Corporation Gas-Works, at a commencing salary of £500 per Annum.
The person appointed will be required to take Full Charge of the Manufacturing and Commercial Departments of the Gas-Works, and will be required to perform all the duties usually performed by a Gas Engineer and General Manager. He must also be capable of carrying out all necessary Extensions of the works.
Preference will be given to Applicants Experienced in the working of Inclined Retorts and Regenerative Furnaces.
The gentleman appointed must devote the whole of his time to the duties of the Office, and will be allowed one articled pupil.
Applications, stating Age, Experience, and Qualifications, and accompanied by not more than Three recent Testimonials, to be sent to me on or before Monday, the 3rd day of April next, endorsed "Gas Engineer and Manager."
Canvassing, either directly or indirectly, will be an absolute disqualification.
By order,
W. J. BOARD,
Town Clerk.
Town Hall, Rotherham,
March 17, 1905.

WANTED, a few Second-hand Cast-Iron PIPES and SPECIALS.
Particulars from the Gas Engineer and Manager, St. Mary Cray, Kent.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

URBAN DISTRICT COUNCIL OF STOURBRIDGE.
(GAS DEPARTMENT.)

THE Gas Committee have For Sale, as they stand, a pair of TOWER SCRUBBERS, each 50 feet by 8 feet, in really good working order, and are offered on account of being now too small.



The highest or any Offer not necessarily accepted.
By order of the Committee,
WM. NORTH,
Engineer and Manager.

NEW Gasholder, 40 ft. diameter by 12 ft. deep, with Steel Standards; also new STEEL TANK to contain same.
Write J. WRIGHT, 181, Queen Victoria Street, LONDON, E.C.

TEST PLANT FOR SALE—We have several small Sets of GAS APPARATUS suitable for Test Plants, including Retorts, Condensers, Scrubber, Purifiers, Gasholders, overhauled and guaranteed, or New throughout.
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

DUMFRIES CORPORATION GAS-WORKS.

STATION METER AND GOVERNOR FOR SALE.

THE Dumfries Gas Commissioners have FOR SALE a STATION METER of 15,000 cubic feet per hour capacity, with 10-inch Valves and Bye-Pass, of modern construction, and in splendid condition. It has been replaced by a much larger Meter of the same pattern and by the same Maker—viz., Messrs. J. & J. Braddock, Oldham. Also a 12-inch Milne GOVERNOR converted to Cowan's Patent, with screw-down Valves and Bye-Pass complete.
These are standing intact as erected; and every facility will be given for internal inspection.
For further Particulars, apply Mr. MALAM, Engineer, Gas-Works.

REDDITCH GAS COMPANY.

PURIFIERS—Set of Four for Sale, 12 ft. by 12 ft. by 4 ft. 6 in. (faced joints), complete with Grids, Weck's Centre Valve, and 10-inch Connections. All in First-Class condition. Replacing with larger.
Particulars from ALBERT E. LAYTON, Manager.

FOR Sale, cheap, a Wrought-Iron SCRUBBER, 20 ft. high by 3 ft. diameter, with 6-inch Valves and Connections.
COCKEY'S WASHER, to pass 100,000 cubic feet per diem., with 6-inch Valves and Connections.
Apply to SAML. WHILE AND SON, 60, QUEEN VICTORIA STREET, E.C.

PURIFIERS, &c., FOR SALE—Sets of 4 ft., 5 ft., 6 ft., 8 ft., 9 ft., 10 ft., 12 ft., 18 ft. squares; also 16 ft. by 12 ft., &c. SCRUBBERS, 8 ft. by 60 ft. 10 inch, 18 inch Square METERS. EXHAUSTERS up to 50,000 feet per hour in Stock. GASHOLDERS and TANKS, also New. State requirements
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

WATER-WORKS PUMPING-ENGINE FOR SALE

MODERN Compound Surface Condens-ing PUMPING-ENGINE and WELL PUMPS for a depth of 200 feet. Engine Cylinders, 25 inches and 54 inches by 5 feet Stroke. Pump 24 inches diameter.
STEEL RISING MAIN, with lowering Rods and Screws.
Further Particulars and order to view to be obtained from the SECRETARY, Corporation Water Offices, BIRMINGHAM.

TAR.

THE Directors of the Chelmsford Gas-light and Coke Company invite TENDERS for the surplus TAR to be produced at their Works to the end of December, 1905. Probable quantity for Sale 40,000 Gallons. Contractor to provide Barrels.
Further Particulars on application to the undersigned
Tenders by April 1 next.
E. W. SMITH,
Engineer and Manager,

COMMERCIAL GAS COMPANY.

TENDERS FOR COAL.

THE Directors are prepared to receive TENDERS for the supply of 210,000 Tons of Clean, Dry, Unscreened, Fresh-Wrought GAS COALS, delivered f.o.b. to the Company's steamers at any suitable port, during the Year ending the 30th of April, 1906.
The deliveries to be in about equal monthly quantities throughout the Year.
Payment in cash monthly.
Parties desiring to Tender for more than One Year must state separately the price and quantity offered for each Year.
Particulars and Forms of Contract may be obtained from the Engineer, Mr. S. H. Jones.
The Directors do not bind themselves to accept the lowest or any Tender.
Tenders, sealed and endorsed "Tender for Coals," to be addressed to the Chairman of the Coal Committee, and delivered at the Company's Offices not later than Nine o'clock on the 30th inst.
Commercial Gas-Works,
Stepney, E., March 22, 1905.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

THE Commissioners invite Tenders for the supplying of—

Lime.	Cast-Iron Pipes and Connections.
Oils and Paints.	Yarn, &c.
Timber.	Iron, Steel, and Implements.
Meters.	Iron Castings, &c., &c.
Gas-Fitters' Stores.	Causeway Repairs.
Wrought-Iron Tubes and Fittings.	Cartages.

required for their various undertakings during the Year from Whitsunday first.
The Contractors must guarantee that in the execution of their Contracts they will pay the Standard Rate of wages, or such wages as are generally recognized as fair in their business.
Tender Forms and all Information can be had on application to the Chief Engineer and Manager at the Gas-Works, New Street.
Offers must be lodged not later than Ten o'clock on Monday forenoon the 10th prox., in sealed envelopes, addressed to the undersigned, and marked "Tender for Lime" or as the case may be.
The Commissioners are not to be bound to accept the lowest or any Tender.
JAMES M'G. JACK,
Clerk.
25, Waterloo Place, Edinburgh,
March 21, 1905.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

GAS COAL AND CANNEL.

THE Commissioners are prepared to receive TENDERS for the supply of GAS COAL and CANNEL for delivery at their Granton Works over a period of Twelve Months or more.
The Contractors must guarantee that in the execution of their Contracts they will pay the Standard Rate of Wages, or such Wages as are generally recognized as fair in their business.
Further Particulars, Schedule, and Form of Tender may be obtained on application to the Chief Engineer, Mr. W. R. Herring, at the Gas-Works, New Street.
Tenders to be lodged by Ten o'clock on Monday forenoon the 10th prox., in sealed envelopes, marked "Tender for Coal," and addressed to the undersigned.
The Commissioners are not to be bound to accept the lowest or any Offer.
JAMES M'G. JACK,
Clerk.
25, Waterloo Place, Edinburgh,
March 21, 1905

This Prospectus has been filed with the Registrar of Joint Stock Companies in accordance with the Companies Act, 1900.

The ROTARY METER COMPANY (1905)

LIMITED.

(Incorporated under the Companies Acts 1862 to 1900 as a Company Limited by Shares.)

CAPITAL - - £20,000

Divided into 20,000 Shares of £1 each, of which the Rotary Meter Syndicate, Limited, take 3600 fully-paid Shares as part of their Purchase Money, and the Vendors take 1500 fully-paid Shares.

Issue of the remaining 14,900 shares of £1 each,

of which 8000 have been already subscribed for by Subscribers to the Memorandum of Association and others,

Payable as follows:—

2/6 per share on application, 2/6 on allotment,

and the Balance as and when required by calls not exceeding 5/- each, with at least One Month's notice of call.

The minimum subscription on which the Directors may go to allotment is 10,000 Shares of £1 each.

DIRECTORS.

THOMAS GARDINER MARSH, Mechanical Engineer, Mawson Chambers, Deansgate, Manchester (Chairman).

FRANKLIN THORP, Mechanical Engineer, Moss Bank, Whitefield, in the County of Lancaster.

HARRY HINDLE CLEGG, Architect, 41, Corporation Street, Manchester.

(With power to add to their number.)

ADVISING ENGINEER.

THOMAS THORP, C.E., Whitefield.

BANKERS.

THE LANCASHIRE & YORKSHIRE BANK, LIMITED, Manchester.

SOLICITORS.

SUTCLIFFE & JARDINE, Halifax, Yorkshire.

AUDITOR.

JAMES DUFF, Barum House, Halifax, Yorkshire, Chartered Accountant.

SECRETARY & REGISTERED OFFICE.

SQUIRE E. WORSLEY, 1, Mawson Chambers, 28, Deansgate, Manchester.

PROSPECTUS.

THIS Company has been formed to acquire the British, American, German, and French Patents for Rotary Gas-Meters, and the British Patents for Rotary Water-Meters, together with the business and undertaking of "The Rotary Meter Syndicate, Limited," and the benefit of a license entered into with The Power Gas Corporation, Limited, in connection with "Mond" and Producer Gas, and a license entered into with Meters Limited, for Water-Meters, the purchase dating as from June 30, 1904.

Up to this date (June 30, 1904) the business of The Rotary Meter Syndicate, Limited, was practically confined to the manufacture of Station Meters used on Gas-Works in their Coal Gas and Water Gas Departments, but "Rotary" Meters were in experimental use with "Mond" Gas, Producer Gas, Coke-Oven Gas, and Air. These experiments have proved very successful, and considerable business is now being done, numerous orders having already been completed and further orders are in hand. The small size and greatly reduced price, as compared with the ordinary Meter, render the Rotary Meter particularly applicable for the above purposes, as also for many purposes for which the ordinary meter has hitherto been too expensive or bulky.

A further application of "The Rotary Meter" was introduced to public notice at the International Gas Exhibition held at Earl's Court, London, during the months of November and December, 1904, and Sample Orders from some 150 Towns have already been received. This Meter—The Discount or Check Meter—is for the purpose of measuring Gas supplied to Gas Fires, Cookers, &c., and it is confidently expected that this Branch of the business will assume large proportions, and that it will eventually result in a handsome profit to the Company.

In order to cope with the increasing business, to deal with the American, German, and French Patents, and the numerous Orders and enquiries, additional capital is now required.

The principal Patents Numbered 20214—1901, for improvements in or relating to Gas-Meters, and 6017—1903, for improvements in Rotating Water-Meters, taken out by Mr. Thomas Thorp, C.E., of Whitefield, and the subsequent improvements thereon to be acquired by the Company, are particularly referred to in the report of Mr. R. J. Urquhart accompanying the prospectus.

Accompanying the Prospectus are copies of the following documents, from which the value of the Patent rights and the prosperous nature of the business may be seen, viz.:—

(*a*) Description of the "Rotary Meter."
(*b*) Description of "The Discount or Check Meter."
(*c*) Copy Report of Directors of the Syndicate to their Shareholders on 27th September, 1904.
(*d*) List of Rotary Meters in use, March, 1905.
(*e*) Report of Mr. R. J. Urquhart, Chartered Patent Agent, of the firm of Urquhart & Bolle, Patent Agents, Manchester, February 27th, 1905.

The contents of the Memorandum of Association, with the names and addresses of the subscribers and the number of shares subscribed for by them in cash, is attached to the Prospectus.

The provisions in the Articles of Association as to qualification and remuneration of Directors, are as follows:—

The Directors shall be paid out of the funds of the Company, all out of pocket expenses incurred by them as such Directors, and also by way of remuneration for their services, such sums as the Company in General Meeting may from time to time determine, and such remuneration shall be divided among them in such proportions and manner as the Directors may determine.

The qualification of every Director shall be the holding of two hundred Shares of the Company, and if not already qualified, he shall acquire the same within two months after his appointment. A Director who ceases to hold his qualification, or does not obtain the same within two months after his appointment, shall *ipso facto*, vacate office, and a person vacating office under the foregoing circumstances shall be incapable of being re-appointed until he has obtained his qualification. Subject as aforesaid, a Director may act before acquiring his qualification.

The names and addresses of the Vendors to the Company and the consideration paid are given below.

The number of Shares to be issued as fully paid is 5100, of which 3600 are to be issued to the said Syndicate as part of the Purchase Money of the patents, business, and property of the Syndicate, and the remaining 1500 to the Vendors. The rest of the Purchase Money is payable in cash.

A Commission for procuring subscriptions for shares in the capital of the Company not exceeding 5 per cent. on the nominal amount subscribed may be paid by the Vendors.

The estimated amount of the preliminary expenses is £1500, exclusive of the said Commission, and is payable by the Vendors.

No amount is payable to any promoter beyond the profit which may be made out of the Contracts hereinafter mentioned. Two of the Directors (Messrs. T. G. Marsh and F. Thorp) are Shareholders in the Syndicate, and therefore entitled to share in the assets thereof, and have also been actively engaged in the sale and manufacture respectively under arrangements with the Syndicate, and are prepared to continue the same with the new Company, but save as aforesaid no Director is interested in the promotion of the Company or the patents, business, or property to be acquired as aforesaid.

The following material Contracts have been entered into, viz.:—

An agreement dated 21st April, 1902, between Mr. Thos. Thorp of the one part and Squire Ed. Worsley of the other part, for sale of his invention in relation to fluid meters, with all improvements and patents, and as to employment of Mr. Thos. Thorp as Consulting Engineer to the Company, with the right to manufacture portions of the Meters and the employment of Mr. T. G. Marsh as outside Manager and outside Engineer. Agreement dated 5th May, 1902, between Mr. Thos. Thorp and Mr. Squire Edward Worsley of the one part, and the Rotary Meter Syndicate, Limited, of the other part, adopting the above agreement.

An Agreement dated the 14th November, 1904, between the said Syndicate of the one part and John William Sutcliffe, of Halifax, in the County of York, Solicitor, and James Duff, of Halifax, aforesaid, Chartered Accountant, of the other part, for the purchase of the patents, undertaking, property, and assets (other than uncalled capital) of the Syndicate for £7200, with a provision that if re-sold to a Company for not more than £10,200 the Syndicate would accept £3600 part of the said purchase money in 3600 fully paid shares of £1 each in such Company, the balance of such purchase money being paid in cash.

An Agreement dated the 22nd March, 1905, between the said John William Sutcliffe and James Duff the Vendors of the one part, and the Company of the other part for the purchase by the Company of the said premises for £10,200 payable as to £7200 to the Syndicate in accordance with the above Agreement and as to £3000 to the said Vendors in manner following, viz., as to £1500 in cash, the remaining £1500 by the allotment to the Vendors or their nominees of 1500 fully paid Shares of £1 each in the Company, the Vendors undertaking to pay the costs of formation and registration of the Company and the preliminary expenses down to the first allotment of shares inclusive of the said commission for subscription of shares. By the said Agreement there is no specific provision made for payment for Goodwill.

The above-mentioned contracts and copies of the Memorandum and Articles of Association of the Company, as well as the documents of which copies are sent herewith, may be inspected by intending applicants at the Company's Registered Office at 1, Mawson Chambers, 28, Deansgate, Manchester, on any day before the closing of the list of subscriptions, between the hours of 11 a.m. and 4 p.m.

Applications for shares should be made on the form below and sent with a deposit of 2s. 6d. per share to the Bankers of the Company, The Lancashire & Yorkshire Bank, Limited, Manchester, on or before the 29th March, 1905.

If no allotment is made, the application moneys will be returned in full.

If an allotment is made of a smaller number of shares than applied for, the balance of the application money will be applied in payment of the amount payable on allotment.

DATED, 23rd March, 1905.

This Form to be filled up and forwarded ENTIRE with Cheque or Cash to the Company's Bankers, THE LANCASHIRE & YORKSHIRE BANK LIMITED, Manchester.

THE Rotary Meter Company (1905) Ltd.

(Incorporated under the Companies Acts 1862 to 1900 as a Company Limited by Shares.)

CAPITAL . . £20,000. Divided into 20,000 Shares of £1 each.

FORM OF APPLICATION.

To the DIRECTORS OF THE ROTARY METER COMPANY (1905) LIMITED.

GENTLEMEN,

Having paid to the Company's Bankers the sum of £.....being a deposit of 2s. 6d. per share on an application for.....Shares of £1 each, in the above-named Company, I request you to allot me that number of Shares, and I agree to accept the same or any smaller number that may be allotted to me, subject to the Memorandum and Articles of Association and upon the terms of the Prospectus, and I authorize you to place my name on the Register of Members in respect of the Shares so allotted to me, and I agree to pay the further instalments upon such allotted shares as the same shall become due.

Name (in full) .....

Address.....

.....

Description.....

Date.....1905.

Signature .....

All Cheques to be made payable to the Bankers.

TENDERS FOR COAL AND SLACK.

THE Directors of the Stretford Gas Company invite TENDERS for the supply of unscreened GAS COALS, GAS NUTS, and GAS SLACK to be delivered during the next One, Two, or Three Years, in monthly quantities, as may be required.

Sealed Tenders to be sent to the Chairman of the Company, not later than Wednesday, April 5, 1905, endorsed "Tender for Coal."

Form of Tender to be obtained from the Secretary, Gas-Works, Stretford.

The lowest or any Tender not necessarily accepted.

By order of the Board,
BENJAMIN HAYNES,
Secretary.

Stretford, March 22, 1905.

MITCHAM AND WIMBLEDON DISTRICT GASLIGHT COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for the supply and erection, at their Works, Mitcham, of a GAS-HOLDER, in Three Lifts, of 36 feet deep, in a Brick built Tank, 150 feet in diameter.

Drawings and Specification may be seen, and copies obtained, at the Offices of the Works on the deposit of £10 10s., which will be returned upon receipt of a *bonâ-fide* Tender.

Sealed Tenders, endorsed "Tender for Gasholder," and addressed to the Chairman of the Company, must be delivered at the Works not later than Twelve noon on Tuesday, the 18th of April.

The Directors do not bind themselves to accept the lowest or any Tender.

BENJAMIN GREEN,
Secretary and Manager.

COUNTY BOROUGH OF WIGAN.

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of STORES over the Year ending on March 31, 1906, as follows:—

(*a*) Wrought-Iron Tube and Fittings.
(*b*) Brass and Copper Tube and Fittings.
(*c*) Lead Gas-Pipe.
(*d*) Street-Lamps.
(*e*) Merchant Iron.
(*f*) Weed Brooms.
(*g*) Shovels and Coke Forks.
(*h*) Wood Troughing and Covering.
(*m*) Galvanized Stove Pipe and Connections.
(*n*) Cast Mains and Connections.
(*o*) Screw and Retort Bolts.
(*p*) Galvanized Buckets.
(*q*) Sulphuric Acid.
(*r*) Surplus Tar.
(*s*) Benzol—90 per cent.

Forms of Tender may be obtained from the undersigned.

The Committee does not bind themselves to the acceptance of any Tender.

Tenders, sealed and endorsed with the name of the article tendered for, to be delivered to Harold Jevons, Esq., Town Clerk, Town Hall, on or before Monday, the 17th of April next ensuing.

A sample of each article to be forwarded, addressed to the Gas Engineer.

JOSEPH TIMMINS, M.Inst.C.E.,
Engineer, &c.

Borough Gas-Works,
March 23, 1905.

BOURNEMOUTH GAS AND WATER COMPANY.

ISSUE OF £10 SEVEN PER CENT. "B" SHARES.

MINIMUM PRICE OF ISSUE £15 PER SHARE.

SALE BY TENDER OF 2000 £10 SEVEN PER CENT. "B" SHARES,

in pursuance of the provisions of the Bournemouth Gas and Water Act, 1896.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company, to SELL BY TENDER 2000 "B" SHARES of £10 each (the Dividend on which is limited to £7 per cent.) to be paid up in full on or before the 31st of May, 1905.

The Company are now engaged in the erection of new Gas-Works at Poole, with all the latest improvements; and the Capital now offered is required for this purpose and also for extention of the Company's existing Works and Plant, to enable them to meet the increased demand for Gas and Water, by reason of the continued development of the district supplied by the Company.

The Dividend on the Ordinary Shares for the Half-Year ended the 31st of December, 1904, was at the rate of Ten per cent. per Annum, with an addition at the rate of Four per cent. per Annum, under the Sliding-Scale, and on the "B" Shares at the rate of Seven per cent. per Annum.

Since the 31st of December, 1888, to the 31st of December, 1903, the Dividend on the Ordinary Shares has been at the rate of 13 per cent. per annum.

The net Profit earned in the Year ended the 31st of December, 1904, after deducting all charges, including Debenture Interest, amounted to £32,074 18s. 8d., which sum was available for payment of Dividends. During the same Twelve Months the sum of £2000 was added to Reserve Fund from profits, and also £705 19s. 7d., from interest on Reserve Investments, and, after payment of Dividends to the 31st of December, 1904, the sum of £8979 1s. remained to be carried forward to the Half-Year ending 30th of June, 1905.

Particulars and Conditions of Tender may be obtained at the Company's Offices, Bournemouth and Poole; or of the Secretary as under.

Sealed Tenders must be sent to the Secretary not later than Eleven o'clock on Thursday morning, the 13th of April, 1905.

By order,
WILLIAM CASH,
Secretary.

London: 90, Cannon Street, E.C.,
March 23, 1905.

BRIDGEWATER COLLIERIES COKE-WORKS.

(THE EARL OF ELLESMERE.)

TENDERS are invited for the Light OIL produced at the above Works for a period of Six or Twelve Months from the 1st of May, 1905, delivered into Contractor's Tanks at the Bridgewater Colliery Siding, Wharton Hall, on the Pendleton and Hindley Branch of the Lancashire and Yorkshire Railway; or at the Brackley Siding on the Little Hulton Mineral Branch of the L. and N.W. Railway.

Tenders, endorsed "Tender for Light Oil," to be addressed to MR. THOMAS M. BROWN, Bridgewater Coal Office, 4, Chapel Walks, MANCHESTER, on or before the 3rd of April, 1905.

Manchester, March 14, 1905.

LIVERPOOL UNITED GASLIGHT COMPANY.

TENDERS FOR CANNEL AND COAL.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the supply of 70,000 Tons of CANNEL, and 200,000 Tons of COAL, to be delivered at the various Works of the Company during the period of Twelve Months, between the 1st of July, 1905, and the 30th of June, 1906.

Tenders will be received for the whole or any portion of the above quantity.

The Directors reserve the right to accept Tenders for the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.

Full Particulars and Printed Forms of Tender can be obtained on application to the undersigned, at the Gas Office, Duke Street, Liverpool, to whom sealed Tenders (on the printed Form only) must be delivered, at or before Ten a.m. on Monday, April 17, endorsed "Tender for Cannel and Coal."

By order,
EDWARD ALLEN,
Engineer.

Gas Office, Duke Street,
Liverpool, March 22, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTH ESSEX WATER-WORKS COMPANY.

NEW ISSUE OF £15,000 FIVE PER CENT. PREFERENCE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock precisely, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
GREAT YARMOUTH WATER-WORKS COMPANY.

NEW ISSUE OF 300 £10 ORDINARY SHARES AND £2000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
ILFORD GAS COMPANY.

NEW ISSUE OF £10,000 ORDINARY "C" STOCK, AND £5000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

120 Pages, Demy 8vo., Bound in Stiff Cloth Cover Lettered, Price 5s. Post Free,

THE

VALUATION

OF

GAS, ELECTRICITY, & WATER WORKS FOR ASSESSMENT PURPOSES

— SECOND EDITION —

By THOMAS NEWBIGGING, M.Inst.C.E., and WILLIAM NEWBIGGING, Assoc.M.Inst.C.E.

WITH AN APPENDIX OF DECIDED CASES.

LONDON: Walter King, 11, Bolt Court, Fleet St., E.C.

To Trustees and Others.

HOOKER and WEBB have received Instructions to SELL BY AUCTION, at the Mart, Tokenhouse Yard, E.C., on Monday, the 3rd of April at Two o'clock precisely, in 164 Lots,

£15,000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK

of the Croydon Gas Company. The Reserve and Insurance Funds of the Company at Christmas last amounted to £44,994 2s. 1d.; the paid-up Ordinary Capital at that date was £310,000, whereas the Debenture Stock now amounts to only £55,000,—thus showing that the Stock offered is a security of the highest class.

Particulars and Conditions of Sale may be had of the SECRETARY, at the Offices of the Company, Katharine Street, CROYDON; at the MART, E.C.; and of the AUCTIONEERS, 4, High Street, CROYDON.

Telephone No. 122 Croydon.

Gas Companies are solicited to try Samples of the

MIRFIELD GAS COAL

UNEQUALLED.

Sperm Value 878·85 lbs. per Ton.

Prices and Analysis on application.

The MIRFIELD (GAS-COAL) COLLIERIES CO., RAVENSTHORPE, NEAR DEWSBURY.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and yield of Gas.

Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals

THE GRASSMOOR CO., LD., CHESTERFIELD.

JOHN HALL & CO.,

STOURBRIDGE,

Manufacturers of

FIRE-BRICKS, LUMPS, TILES, GAS RETORTS,

And every description of Fire-Clay Goods.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY, LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

THE PERFECT MANTLE CO^Y.,

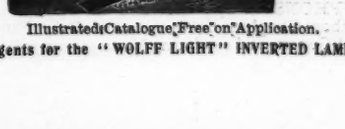
28, Minories, London, E.C.

Manufacturers of Incandescent Mantles.

Importers of all kinds of Fittings & Accessories

TRY OUR WELL-KNOWN

SUPERIOR "PERMCO" MANTLES.



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GAS METERS.
SLOT METERS.
GEYSERS.
COOKERS.
STOVES.
WORKSHOP LAMPS.
GAS IRONS.
IND. GAS APPLIANCES.
FITTINGS.

CENTRAL WORKS in DESSAU
OF THE
GERMAN CONTINENTAL GAS ASSOCIATION
(Deutsche Continental Gas Gesellschaft).

For Illustrated Price Lists and full Particulars apply to our SOLE AGENTS FOR THE UNITED KINGDOM AND COLONIES:

THE INCANDESCENT LIGHTING & MANTLE INSURANCE CO.,
57/58, CHANCERY LANE, LONDON, W.C.
Telephone: 12788 CENTRAL. Telegrams: "FRAENKL, 58, CHANCERY LANE."

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE LIMITED,
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 34, OLD BROAD STREET, E.C.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER.
Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

Price 1s. Post Free.
A MEMORANDUM
ON THE
MOND GAS SCHEME
By F. N. KEEN,
Of the Middle Temple, Barrister-at-Law.

The Pamphlet contains a Summary of the Principal Provisions of the South Staffordshire Mond Gas (Power and Heating) Company's Act, 1901, and of some of the matters raised in evidence before the Parliamentary Committees that dealt with the Bill.

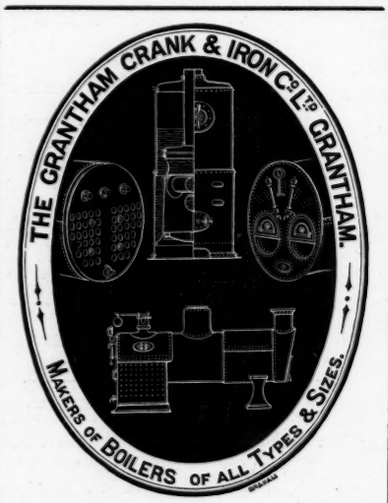
LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

RAILS.
New and Second-Hand with all Accessories; also Tip Waggons and Turntables.
B. M. RENTON,
MIDLAND WORKS,
SHEFFIELD.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

ALEXANDER CAMERON,
GAS AND CANNEL COAL MERCHANT.
48, WEST REGENT STREET,
GLASGOW.

TELEGRAPHIC ADDRESS:— "FITZMAURICE, LONDON." TELEPHONE NO. 11,113 CENTRAL.
ROBERT B. FITZMAURICE,
4, East India Avenue, London, E.C.
Shipping, Insurance, and Chartering Agent for several Foreign Gas Companies, Municipalities, and Gas Plant Manufacturers.
FORWARDS GOODS TO ANY PORT FROM ANY TOWN IN U.K.
Quotations if desired, & Orders promptly executed.



ONWARD
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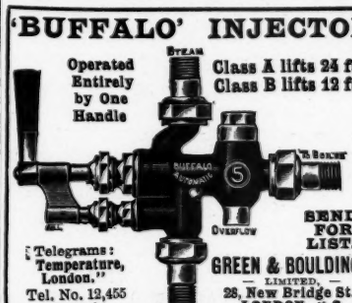

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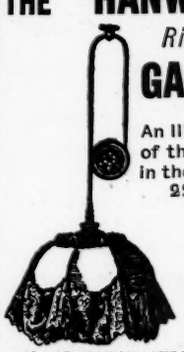
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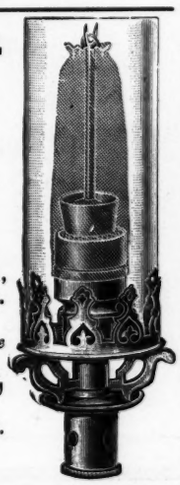

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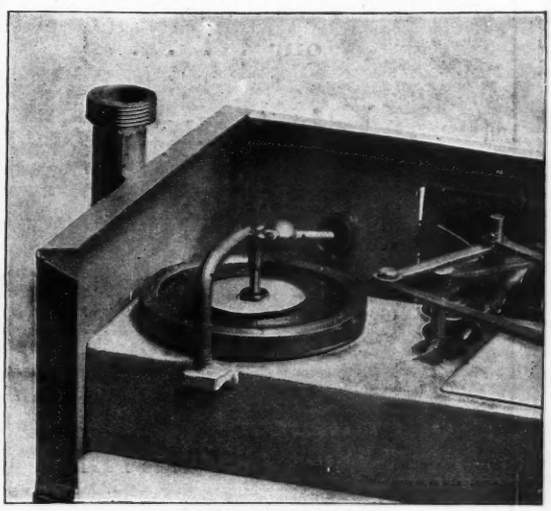

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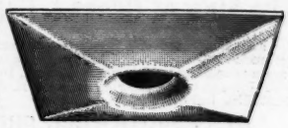

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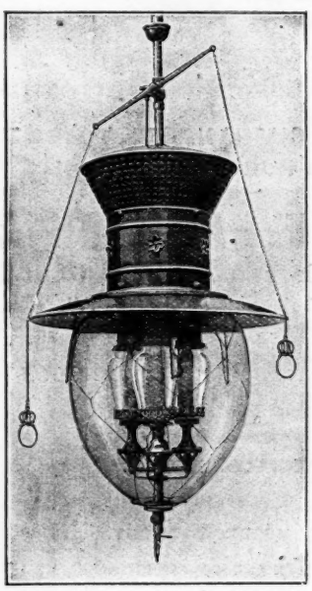

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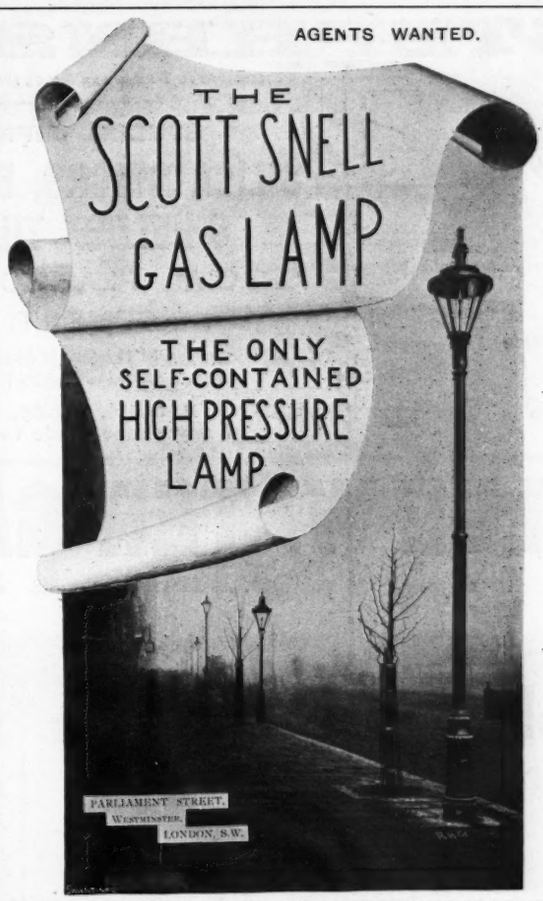

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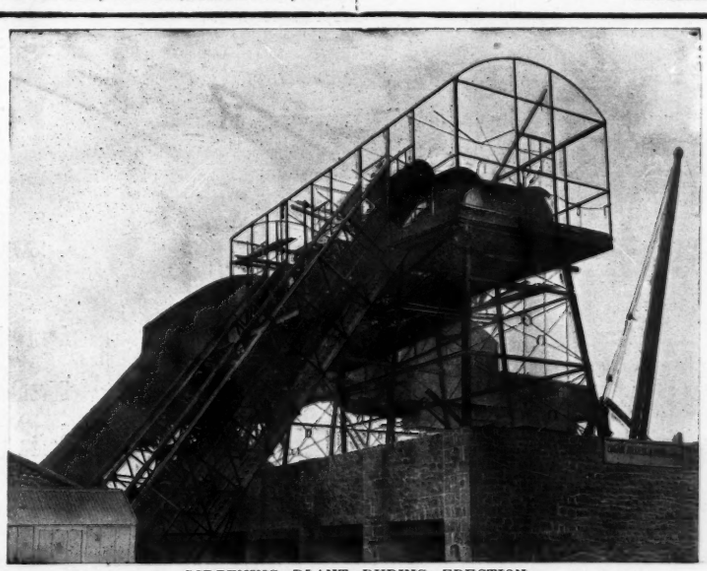

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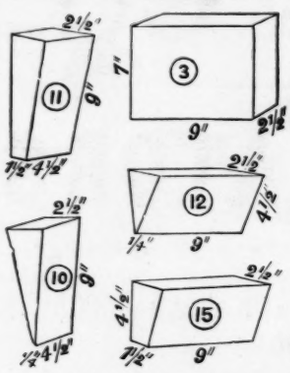

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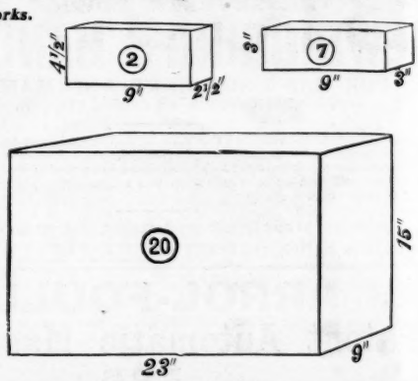

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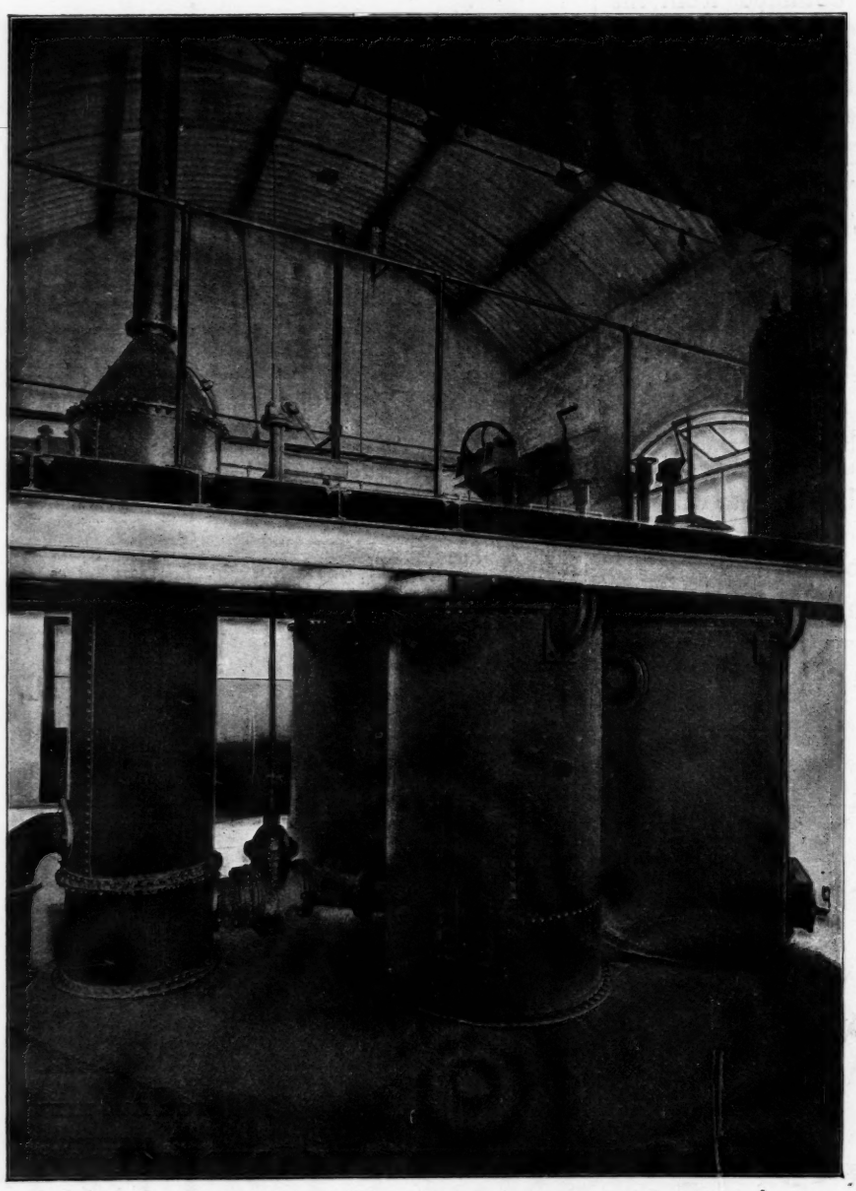

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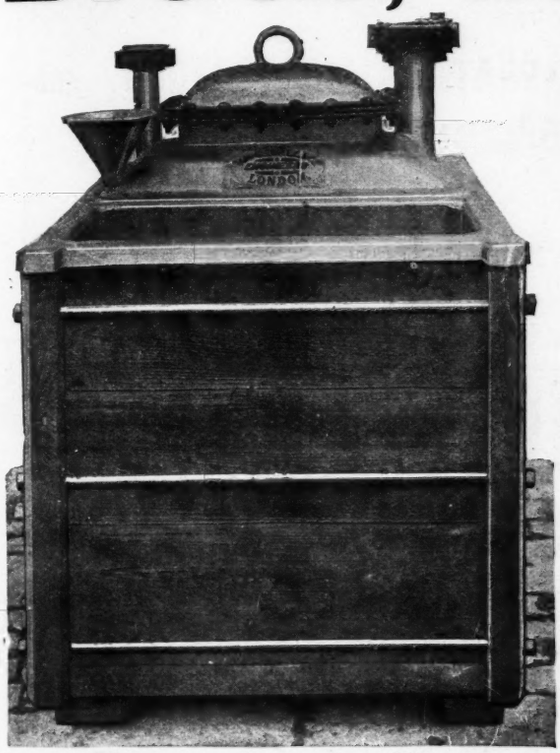

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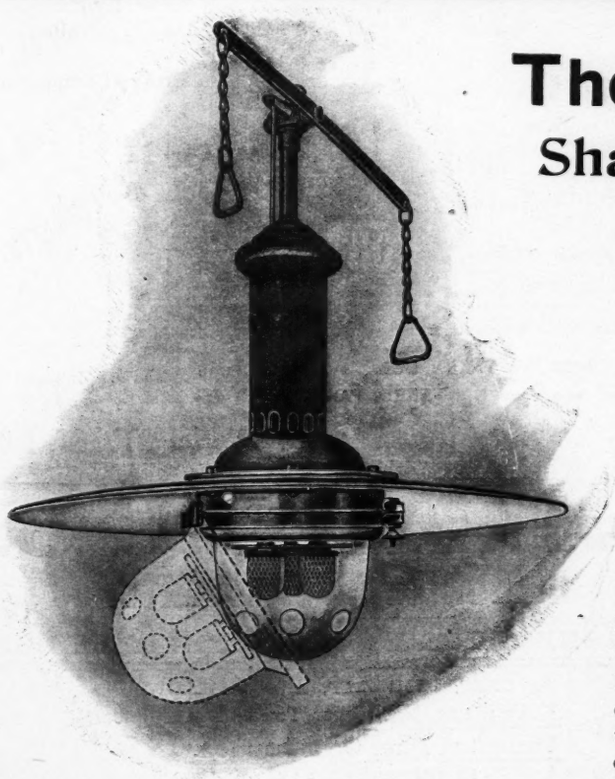

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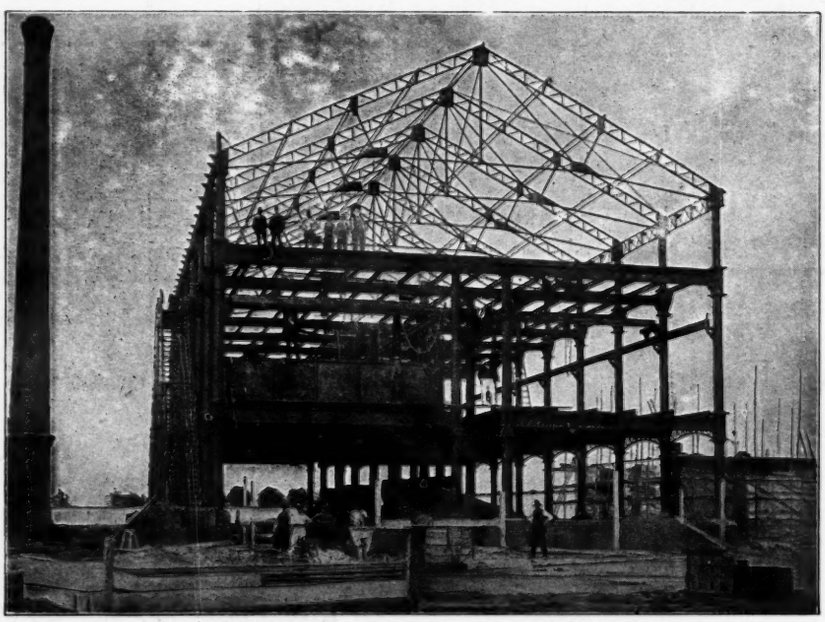

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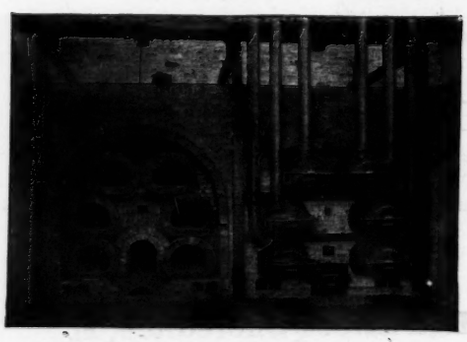

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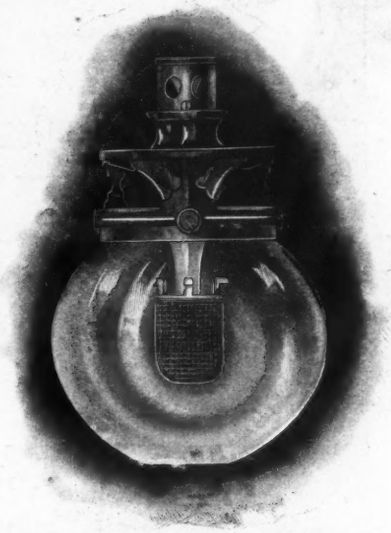

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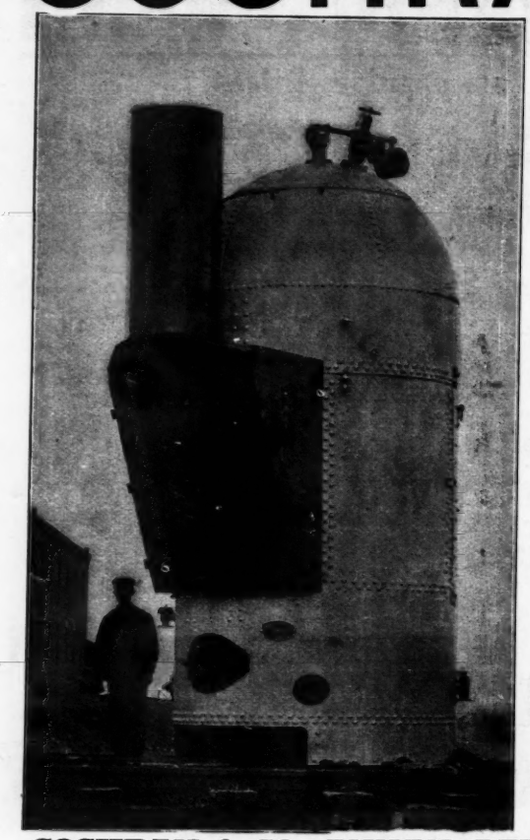

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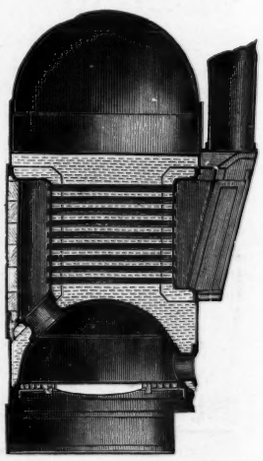

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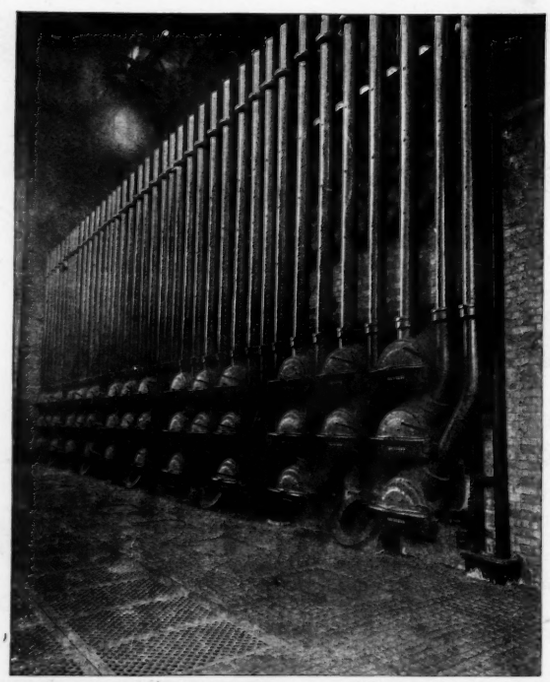

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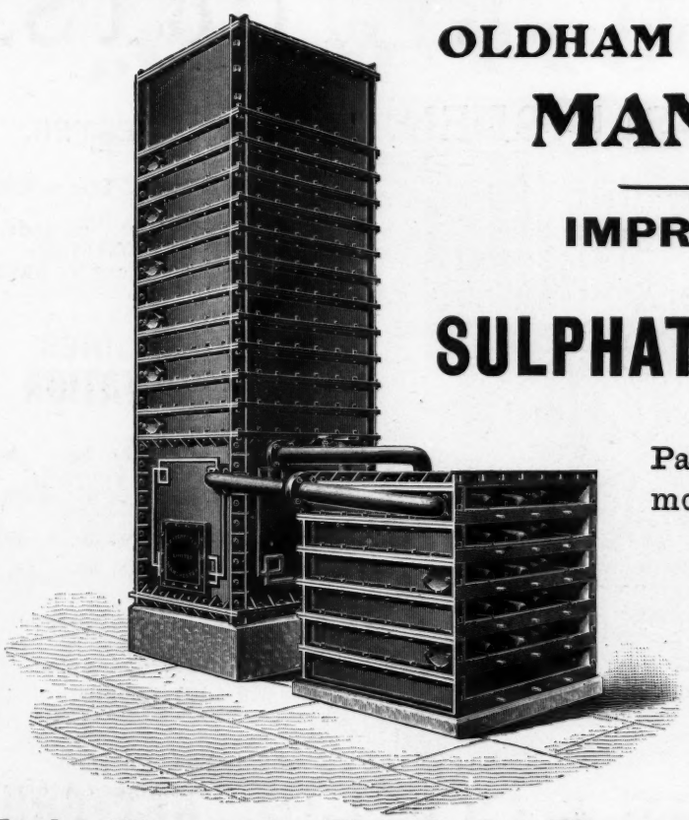

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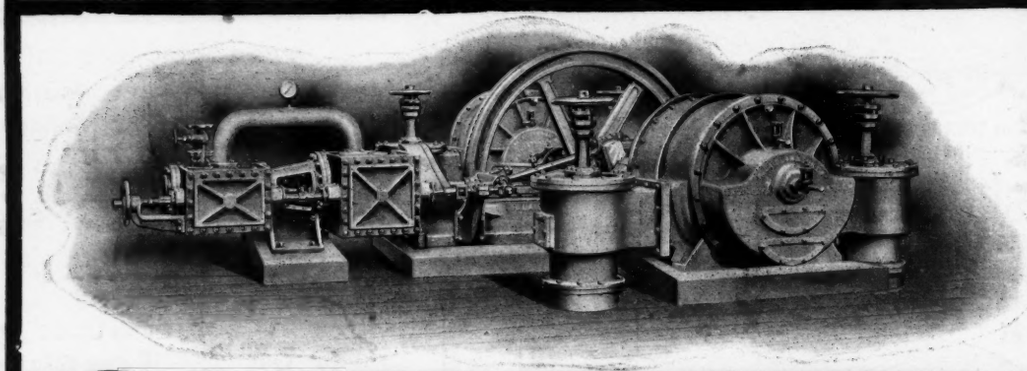

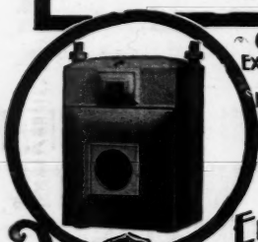

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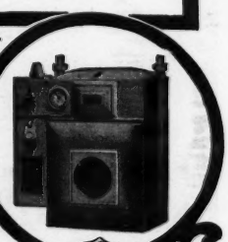

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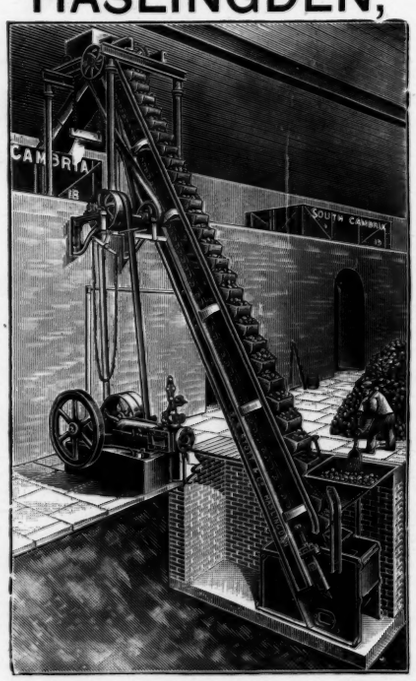

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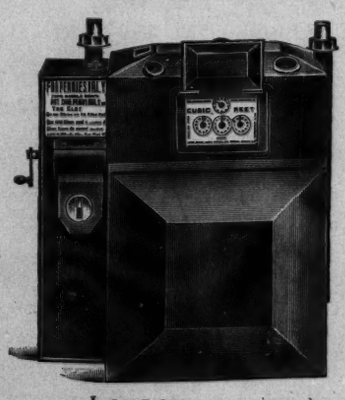
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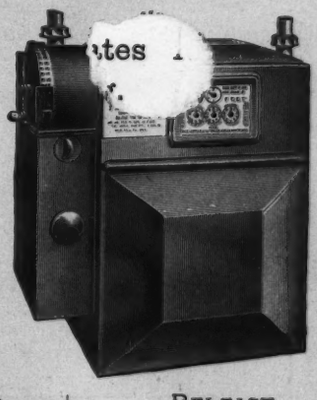
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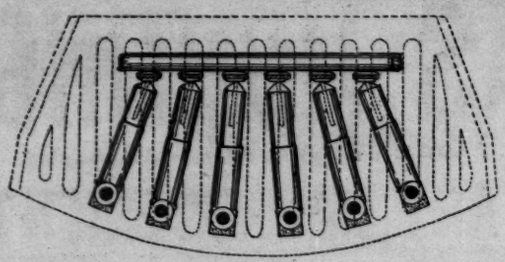

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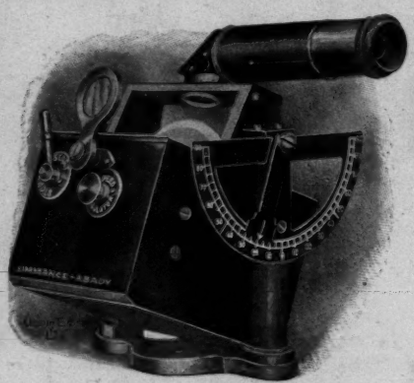

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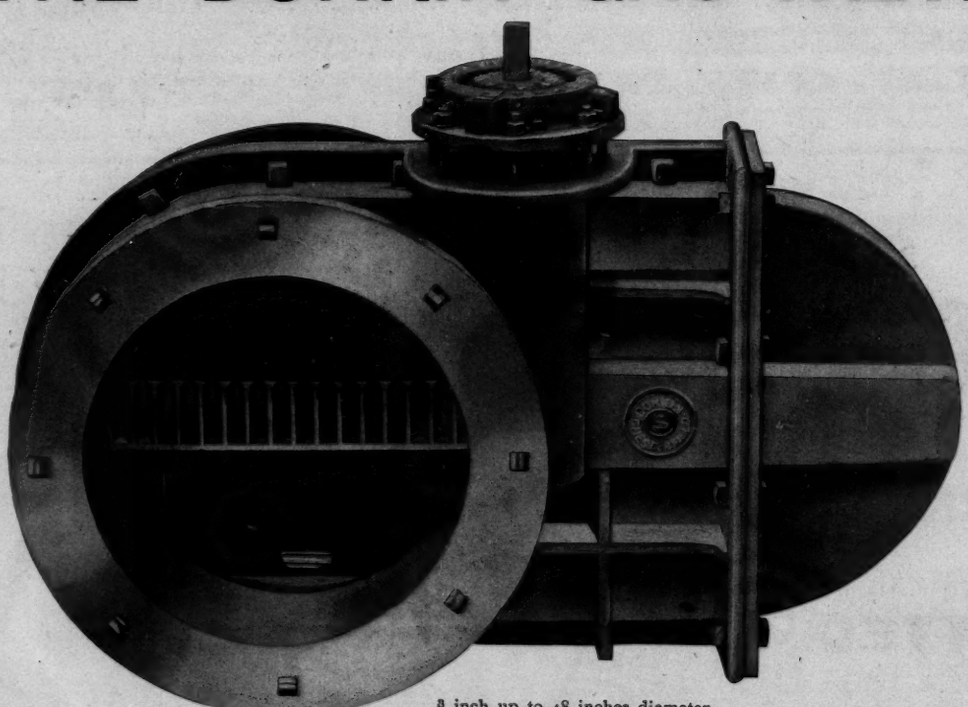

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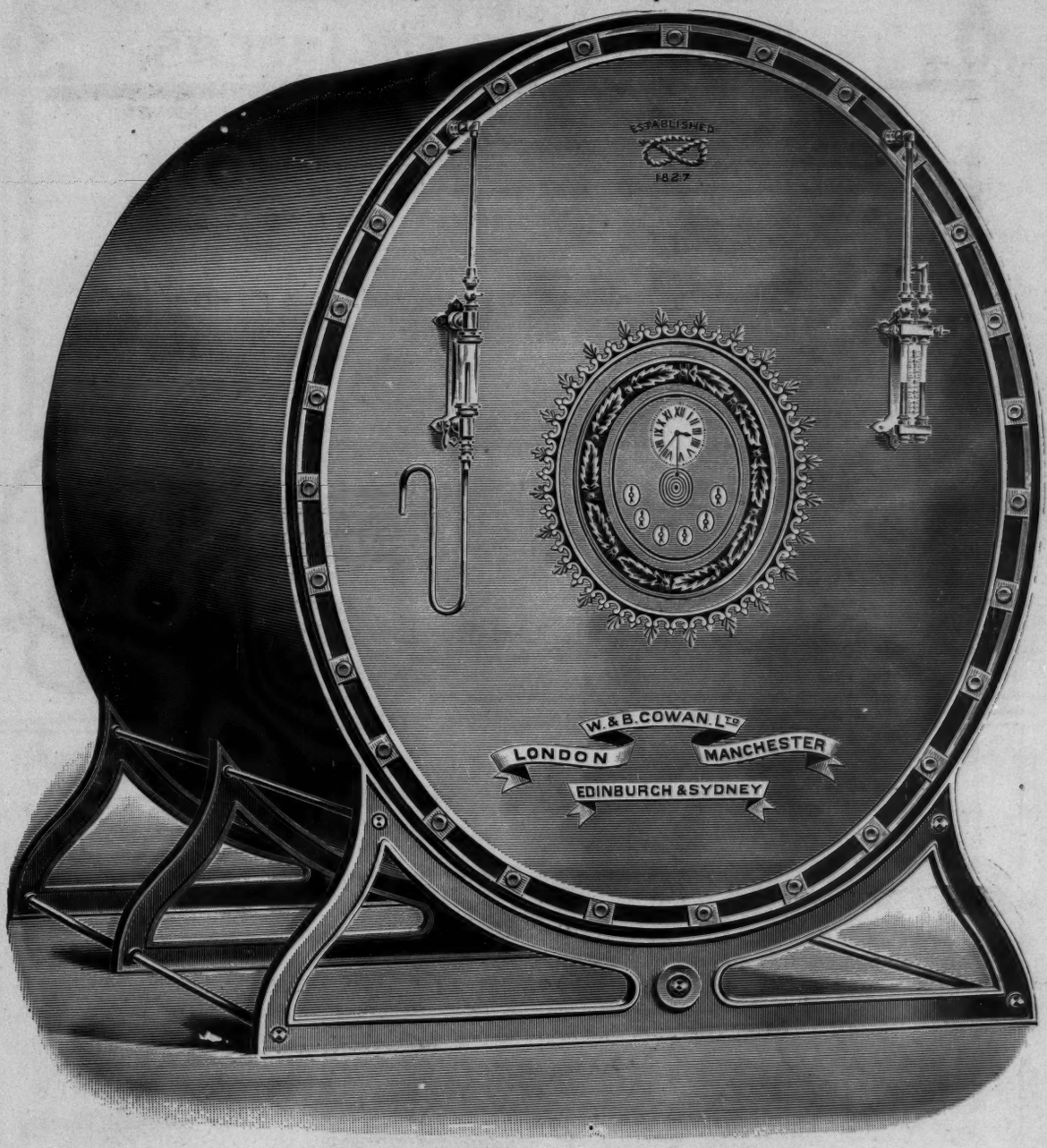

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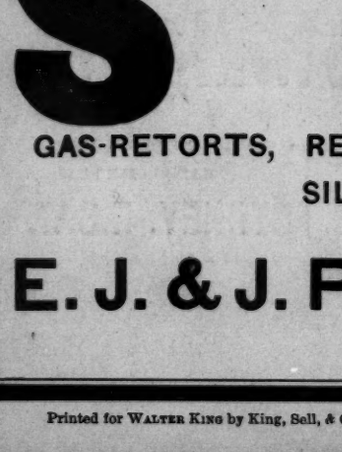

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